Chapter 1
System Description Specification

1. SCOPE

This document describes the functional specifications for the Compal Netbook personal computer NTV00 series. The system is hardware and software compatible with the IBM PN/ATX personal computer.

1.1 CPU

- Intel® Atom™ Processor N455 / N475

1.2 Memory

- No on board memory
- Support DDR-III 667MHz
- One SODIMM Support with 1GB modules (Maximum Support 2GB)

1.3 Chipset

- Intel® NM10 Express Chipset

1.4 Display

- Support 10.1” WSVGA, 1024 x 600

1.5 Keyboard

- 84/85 keys support with 100/101 key emulation without stick-point
- Windows key, Application key
- 17mm pitch, 2.0mm travel length
- Multi-Language support

1.6 Hard Disk Drive (HDD)

- 9.5mm, 2.5" S-ATA HDD, 5400rpm,160/250/320/500 GB capacity
- 7200rpm, 160 GB capacity
- Easily removable

1.7 Graphics Chip

- Pineview-M (Intel® Graphics Media Accelerator 3150)

1.8 Audio

- Realtek ALC272
- 2 channel HD Audio
- Compliant with Universal Audio Architecture
- Microphone-in and headphone-out
- Two stereo 1.0W speakers

1.9 Pointing Device

- Touchpad without buttons (support multi-touch)

1.10 I/O Ports

- RJ-45 jack x 1
- Headphone-out x 1
- Microphone-in x 1
- 3-in-1 Card Reader x1
- USB 2.0 x 3

- RGB: VGA port x 1, 15pins
- DC-in jack x 1
- Kensington lock x 1
- Internal analog microphone x 1

1.11 System Status Indicators (UI spec)

- 1 LED for Power Button(Blue)
- 1 LED for Power Status(Blue)
- 1 LED for Battery status (Charging / Full / L1 / L2) (Blue/Amber)
- 1 LED for HDD activity (Blue)
- 1 LED for Wireless LAN/Bluetooth (Blue)
- 1 LED for T/P Disable (Amber)

1.12 Web Camera

- 1.3M Pixel CMOS via USB2.0 interface

1.13 LAN

- Realtek RTL8103EL

1.14 WLAN (Option)

- Wireless LAN, 802.11b/g, 802.11n via PCI-E interface

1.15 3G

- 3G module via USB2.0 interface

1.16 Bluetooth (Option)

- Bluetooth Ver. 2.1 module with USB2.0 interface

1.17 Media Card Reader

- 3-in-1 Card Reader(SD, MMC, MS)

1.18 Control Buttons

- Power button x 1
- Magnetic lid switch control for system standby/resume

1.19 Kill Switch

- YES, for WLAN/3G/Bluetooth

1.20 AC Adapter

- Universal AC adapter. 100-240V AC, 50-60HZ, 0.8A
  - 30W with 19V DC, 1.58A
  - 2 pin 240V AC cable
  - Wall-mount type

1.21 Battery

- 3-cell Li-On, 18650 type, 2250mAh (Standard)
- 6-cell Li-On, 18650 type, 4500mAh (Option)
- Life Cycle: 70% Design Capacity after 300 Cycles in 25degreeC

1.22 Software

- Phoenix BIOS

- Flash ROM 1MB
- Support multi-boot
- Suspend to RAM (S3)/Disk (S4)
- Support SMBIOS 2.4 PCI2.2
- DMI utility for BIOS serial number configurable/asset tag
- Support PXE
- Wake on LAN from S3
- Wake on LAN from S4 in AC mode

1.23 Application

- Wireless select enable/disable
- Lock key

1.24 OS

- Windows XP Home edition 32bit
- Windows 7

1.25 Mini Card

- 1 Mini-card slot for WLAN module

1.26 Security

- Kensington lock

1.27 Regulatory

- EMI: FCC-B, CE, CCC, C-Tick, BSMI
- Safety: Compliant to UL/CSA, TUV, CB,
- WHQL LOGO (Windows XP home /Windows 7)
- Energy Star 5.0

2. Mechanical Specification

FOR 10.1" Notebook
10.3"(W)x7.4"(D)x1.04"(H)[260.0mm(W)x186mm(D)x26.4mm(H)]
2.3lb~2.4lb(including: HDD and BATT module)

2.1 Option Pack:

- AC adapter : 180g
- HDD Pack : 104g(9.5mm)
- SSD Pack : 14g
- BATT (Li-ion) : 165g(3cell)
- BATT (Li-ion) : 355g(6cell)

2.2 Mechanical Function

- Removable HDD.
- Module (BATT)
- Battery changeable (Li-ion).
- For security can use Kensington Lock.
- Scissor type key board standard pitch 2.0 m/m travel length.

2.3 Mechanical Material

- Plastic PC+ABS(LG, GN-5001RFA),(UNI, MB-1700),
  (UNI, MB-8800), (BAYER, FR3002).
- Plastic PC+ABS+Talc (LG, GN-5151RFA),(UNI, TMB-1615)

Chapter 2 Software Specification

1. System Components Summary

Processor	- Intel Atom 45nm Standard Voltage: - N455:1.66GHz. 667MHz FSB, 512KB L2 catch. - Intel Atom 45nm Standard Voltage: - N475:1.83GHz. 667MHz FSB, 512KB L2 catch.
Core Logic	- Intel® NM10 Express Chipset.
System Memory	- No on board memory - Support DDR-III 667MHz. - SODIMM with 1GB/2GB modules (Maximum Support 2GB) - Easy upgrade from bottom side for one SODIMM.
Display	- 10.1" WSVGA(1024 x600)
HDD	- 9.5mm, 2.5" S-ATA HDD, 5400rpm, 160/250/320 GB capacity - Easily removable
Video Chip	- Pineview-M (Intel® Graphics Media Accelerator 3150)
Audio	- Realtek ALC272 - 2 channel HD Audio - Compliant with Universal Audio Architecture - Microphone-in and headphone-out - Two stereo 1.0W speakers with chamber
On-board Comms	- Realtek RTL8103EL - Wireless LAN, 802.11b/g, 802.11n via PCI-E interface - 3G module via USB2.0 interface - 1.3M Pixel CMOS via USB2.0 interface - Bluetooth Ver. 2.1 module with USB2.0 interface
Keyboard	- 84/85 keys support with 100/101 key emulation - Windows key, Application key - 17mm pitch, 2.0mm travel length - Multi-Language support.
Pointing Device	- Touch Pad without buttons (support multi-touch)
I/O Ports	- RJ-45 jack x 1 - Headphone-out x 1 - Microphone-in x 1 - 3-in-1 Card Reader x1 - USB 2.0 x 3 - RGB: VGA port x 1, 15pins - DC-in jack x 1
User keys	- Power Button. x 1 - Kill switch x 1 - Magnetic Lid Switch. x 1
AC adapter	- Universal AC adapter. 100-240V AC, 50-60HZ ➢ 30W with 19V DC ➢ 2 pin 240V AC cable ➢ Wall-mount type
Battery	- 3-cell Li-On, 18650 type, 2250mAh (Standard) - 6-cell Li-On, 18650 type, 4500mAh (Option) - Life Cycle: 70% Design Capacity after 300 Cycles in 25degreeC
Software	- Phoenix BIOS - Flash ROM 1MB - Support multi-boot - Suspend to RAM (S3)/Disk (S4) - Support SMBIOS 2.4 ,PCI2.2. - DMI utility for BIOS serial number configurable/asset tag - Support PXE - Wake on LAN from S3 - Wake on LAN from S4 in AC mode
Operating System	- Windows XP Home edition 32bit - Windows 7

Control Buttons	- Power button x 1 - Magnetic lid switch control for system standby/resume

2. System Controls

2.1 Buttons

2.1.1 Power Button

The activity of the power button is as follows:

- If system is Off/Hibernate: System will be turned on while Power switch is depressed
- If system is in Standby state: System will resume while Power switch is depressed.
- If system on with legacy mode: depress this button will turn off power.

If system is running in ACPI OS, the power button acts as the sleep button, and let OS controls the policy of power button which is defined in Power Option under the OS.

2.1.2 Power Button Over-ride

Holding down the Power Button for 4 seconds will cause an unconditional transfer to the off state without notifying the operating system.

2.1.3 Lid switch

If the system is running under legacy mode:

- Closing the lid will turn off LCD backlight.

If the system is running under ACPI mode:

- The operating system will determine what action to take when the lid is opened and closed.

The function of lid switch will follow the OS setting in power management (Nothing, Standby or Hibernate). If nothing, the backlight must turn off when the lid is closed.

2.2 System status indicators

Please refer to Keyboard BIOS specification.

3. Core BIOS Features

3.1 Multi Boot

The netbook can support Multi-Boot for selecting the boot sequence of Hard Drive, Removable Devices, Network in Setup.

4. Thermal management

Please refer to Keyboard BIOS specification.

5. Power Management for ACPI mode

5.1 Introduction

The netbook supports ACPI. The system will dynamically switch to ACPI mode for configuration and power management when an ACPI OS is loaded.

When ACPI is not loaded and enabled, the power management function will be disabled.

5.2 System Time-outs

If the system is running in ACPI mode, system Time-outs is handled by the operating system. BIOS time-outs are disabled. System time-outs are set using the control panel power applet.

5.3 System Power Management

The overall system can be in one of the system power states as described below:

ACPI mode	Power Management
Mech. Off (G3)	All devices in the system are turned off completely.
Soft Off (G2/S5)	OS initiated shutdown. All devices in the system are turned off completely.
Working (G0/S0)	Individual devices such as the CPU and hard disk may be power managed in this state.
S3 Sleeping State	CPU set power down VGA Suspend Audio Suspend Hard Disk Power Down
S4 Sleeping State	System Saves all system states and data onto disk prior to power off the whole system.

5.4 Device Power Management

Under ACPI mode, the device specific power management supported by this netbook includes the CPU throttling, monitor power management and the hard disk.

5.4.1 CPU power management

ACPI mode

The operating system detects when the system is idle and places the CPU in one of the 3 CPU low power states (C1, C2 or C3) depending on how much latency it believes the system can afford.

The C1 state is simply the CPU halt instruction. The C2 state is the CPU stop grant state. The C3 state is the CPU stops clock state. The CPU stays in this state until an interrupt occurs.

5.4.2 Hard Disk

The operating system uses the spin down timer of the hard drive to set time-outs. The BIOS time-out of the hard disk must be disabled in ACPI mode. The user can sets the hard disk spin down time-out in the control panel power applet.

5.4.3 Display Device

The monitor can be turned off after a period of no activity based on the settings of the OS.

5.4.4 System Wake Up Sources

The table below lists the wake up events for all low power states:

Events	S3	S4	S5	Process required
Any key	O	X	X	X
Power button	O	O	O	X
LAN (On board)	O	O	X	O
RTC	O	O	X	O
Critical low battery	O	X	X	O

Field ‘Process Required’ identifies that further process for the occurred events must be processed during wake up or resume procedure.

Notes:

*1: Hot keys are not wake up source of standby, suspend to RAM and Hibernate states.

*2:Lan(On board) and RTC can wake up source of Suspend and Hibernate states with AC mode.

5.4.4.1 LAN

LAN (On board)
The function of waking up the system from standby (DC/AC)/hibernation (AC mode) is supported.

5.4.4.2 Real Time Clock Alarm

The Real Time Clock alarm interrupt will wake the system from Standby (DC/AC) / Hibernation (AC mode)

5.4.4.3 Critical Low Battery

Critical low battery event can wake the system from Standby (DC mode) in ACPI mode.

5.5 Hibernation

To support the hibernate state, the save to disk partition or file will be created by the operating system if the user select to enable the hibernation.

It is the responsibility of the operating system to save the system state to a disk file and restore the system state when it is turned back on.

6. ACPI (Advanced Configuration and Power Interface)

6.1 Introduction

The Advanced Configuration and Power Interface (ACPI) is a well-specified power management and configuration mechanism. It evolves the existing collection of power management codes, APM, PnP BIOS, and Etc.

6.2 ACPI Sleep Status

BIOS must support the following sleep states – S3, S4 and S5.

6.3 Power State Transition Diagram

The state transition diagram in ACPI mode is as follows:

From (State)	Leave By Condition	Enter (State)
S3	Power Button	S0
	On board LAN	
	Any key	
	Alarm	
	Critical low battery(Only in DC mode)	
S4	Power Button	S0
	On board LAN (Only in AC mode)	
	RTC(Only in AC mode)	
S5	Power Button	S0
S0	Press Lid switch (depends on ACPI OS setting)	S3
	Standby icon in shutdown menu in Windows.	
	ACPI OS timer expired	
	Critical low battery (depends on ACPI OS setting)	
S0	Press Lid switch (depends on ACPI OS setting)	S4
	Press Power Button (depends on ACPI OS setting)	
S0	Press Lid switch (depends on ACPI OS setting)	S5
	Press Power Button (depends on ACPI OS setting)	

6.4 Storage Devices and Batteries

Possible storage devices are FDD, HDD, CD-ROM and DVD-ROM

- Floppy Disk and Hard Disk, CD-ROM and DVD-ROM

  The BIOS must report the correct types of these devices if the drive is installed in the system during POST. Two devices, which belong to the same category, are not supported in this netbook.

- Batteries

The BIOS must follow ACPI specification and report the correct number of the installed battery and status.

6.5 Bootable Device

The system is capable of booting from onboard HDD, external USB Floppy and USB Flash device.

6.6 Embedded controller

The keyboard controller will act as the ACPI embedded controller and support the ACPI EC protocol and interface.

7. PC2001

The netbook must meet Microsoft Logo requirements in accordance with the PC2001 Guide and the Microsoft Logo test programs.

8. Miscellaneous Features

8.1 Single BIOS ROM

The system BIOS and Keyboard BIOS share one single flash ROM. The size of the flash ROM is 1MB.

8.2 USB Support

This feature allows the use of a USB keyboard to access BIOS Setup and to be used in DOS without additional drivers. USB floppy boot is also supported. The driver provides other USB devices support after loading the operating system.

8.3 Flash utility – one BIOS ROM only

The flash utility can be used to program both system and keyboard BIOS at the same time.

8.4 Crisis Recovery

This feature provides an opportunity for system that cannot boot up. With a crisis USB flash stick, the system can perform crisis recovery by using internal PS2 keyboard.

To perform crisis recovery using keyboard, do the following:

Power off the system.

Plug-in the USB flash stick drive with crisis with crisis file inserted.

Hold down Fn + B keys.

Plug-in AC adapter and make sure it is powered.

Power on the system from off state (i.e. cold boot) while holding down <Fn+B> key.

After POST, release <Fn+B> key. The system should read from USB flash stick and perform crisis recovery action.

8.5 VGA Support

This section describes the expected behavior when a video monitor is connected to the VGA port on the netbook .The feature needs VGA driver support

The BIOS will determine the presence of an external VGA monitor.

Video modes supported on the secondary display path (need VGA driver support)

Supported video modes and timings please refer to the technical reference of VGA vendor. In particular, text mode and standard VGA modes are not supported.

9. Customer Specific Features

9.1 Display of System Type and BIOS Version Number on Boot

BIOS Version V1.00*

Note: * The numbers of BIOS version will be changed.

9.2 CMOS RAM management

The BIOS will automatically update certain information in CMOS on each boot. This information includes:

- DRAM size and configuration
- Hard disk configuration

9.3 System Management BIOS(SM BIOS) version 2.4 (DMI 2.0)

Limited DMI 2.0 BIOS information are provided:

BIOS version number is type 0 data item.

Type 1:

- System serial number – 64 alphanumeric characters with 12-character bundle number
- System manufacturer name – 'COMPAL'
- System product name – 32 alphanumeric characters
- System version – 32 alphanumeric characters

Type 2:

- Motherboard Product name – NTV00

Type 3:

- Asset tag number –64 alphanumeric characters

9.4 EEPROM

There is one EEPROM that is used to store many important system and user data in the netbook (some data are reserved for future to use). The size of the EEPROM is 2K bytes.

The EEPROM map is listing as below:

Name	Offset	Comments
System Serial Number	00h – 1Fh 20h – 3Fh	32 bytes of Serial number. 32 bytes of Bundle number.
Manufacturer name	40h – 4Fh	16 bytes for DMI type 0 BIOS Vendor type 1/2/3 Manufacturer
System version	50h – 6Fh	32 bytes of System version.
UUID	70h – 7Fh	16 bytes for UUID.
System product name	80h – 9Fh	32 bytes of System product name.
DMI type 11	A0h – DFh	64 bytes for DMI type 11
Reserved	DEh – E9h	Reserved
AHCI	EAh	1 bytes for AHCI
Reserved	EBh – EFh	Reserved
BIOS record data address	E0h – FFh	32 bytes for BIOS record data address
BIOS record data address	FEh	1 bytes for BIOS record data address

Reserved	FFh	Reserved
LAN_FIRST_BOOT	100h	1 byte for LAN_FIRST_BOOT
Reserved	101h – 1F2h	Reserved
BIOS record data address	100h-120h	32 bytes for BIOS record data address
Reserved	121h – 1FFh	Reserved
Asset tag number	200h – 23Fh	64 bytes for DMI Type 3
Reserved	240h - 5FFh	Reserved
Factory record data address	600h – 6FFh	256 byte Factory record data address
Reserved	700h - 7FFh	Reserved

10. System Setup

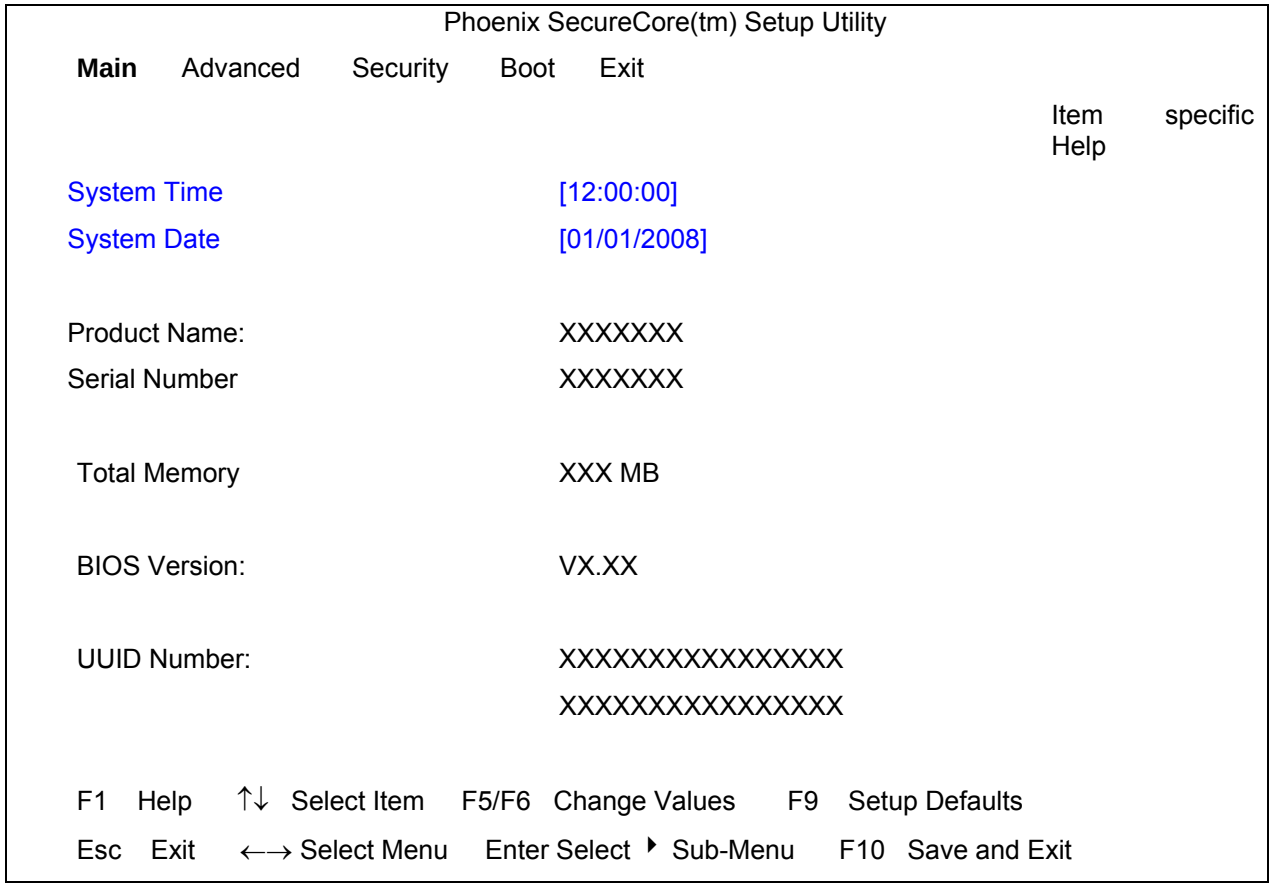
10.1 Invoking setup

The setup function can only be invoked by pressing F2 when “Press <F2> to enter Setup” message is prompted on the bottom of screen during POST.

During setup, all Fn function keys and power saving functions are disabled.

10.2 Setup screens

10.2.1 Main Menu


Phoenix SecureCore(tm) Setup Utility
Main Advanced Security Boot Exit
Item specific Help
System Time [12:00:00]
System Date [01/01/2008]
Product Name: XXXXXXX
Serial Number XXXXXXX
Total Memory XXX MB
BIOS Version: VX.XX
UUID Number: XXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXX
F1 Help ↑↓ Select Item F5/F6 Change Values F9 Setup Defaults
Esc Exit ←→ Select Menu Enter Select ▸ Sub-Menu F10 Save and Exit

System Time and Date

The hour is displayed with 24 hours format. The values set in these two fields take effect immediately.

Product Name, Serial Number and UUID Number

Display product name, serial number and UUID number.

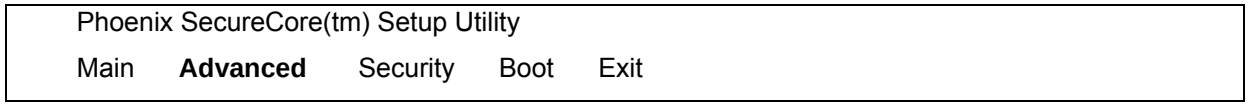
Total Memory

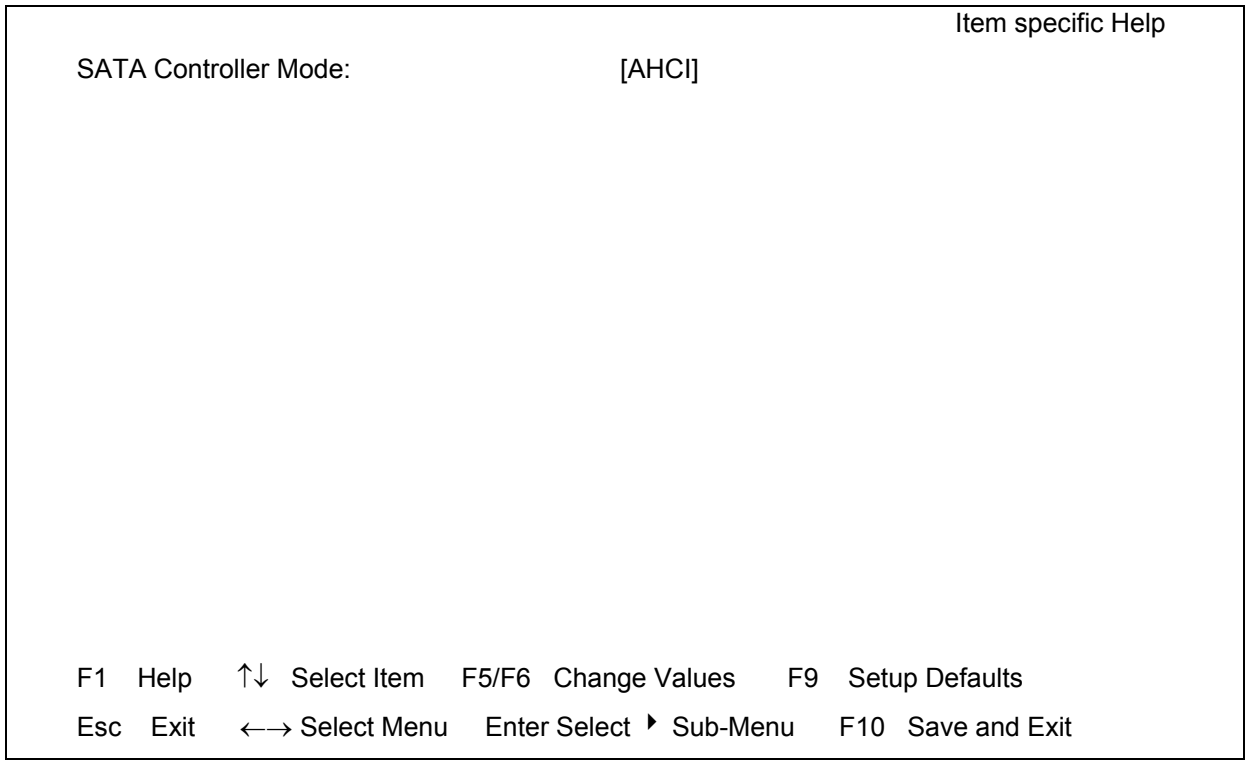
This field reports the memory size of the extended memory with an integer in the system.

BIOS Version

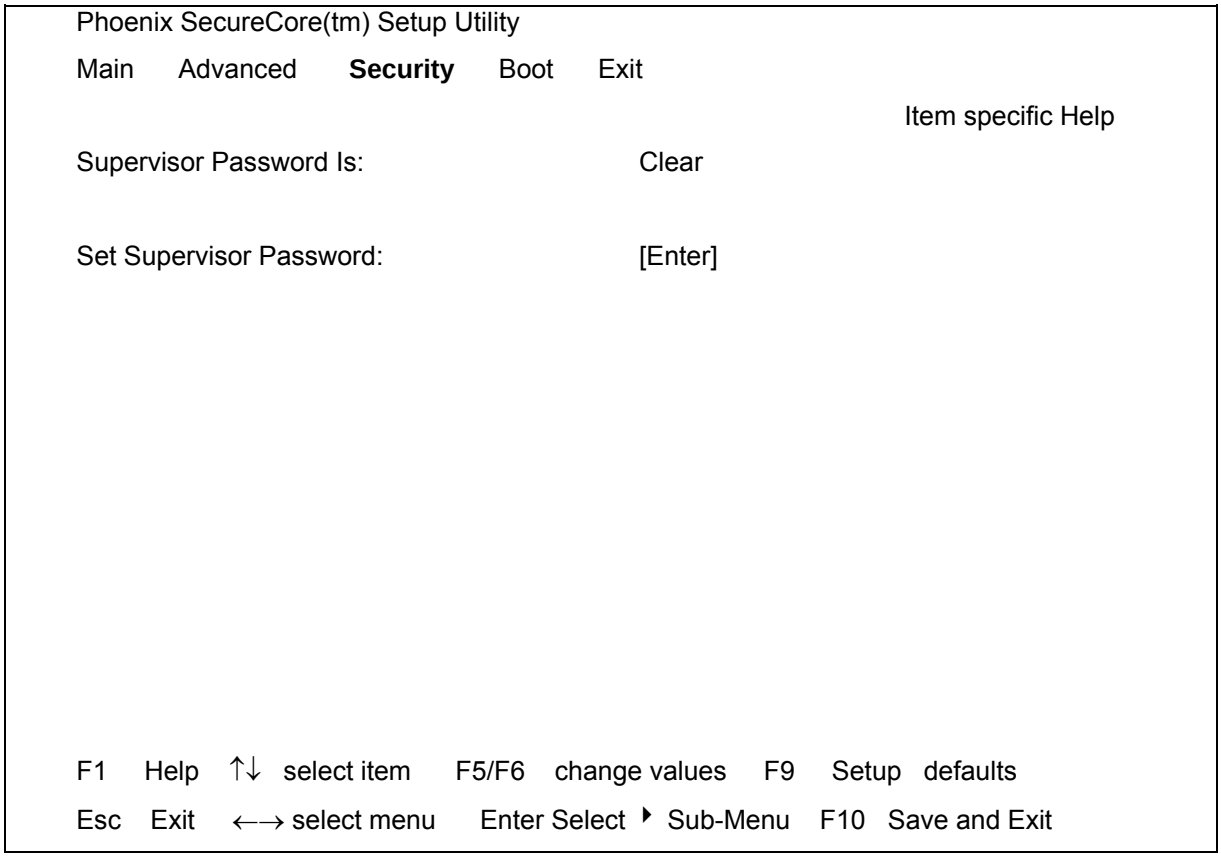
This field displays current version of the BIOS.

10.2.2 Advanced Menu




Item specific Help
SATA Controller Mode: [AHCI]
F1 Help ↑↓ Select Item F5/F6 Change Values F9 Setup Defaults
Esc Exit ←→ Select Menu Enter Select ▸ Sub-Menu F10 Save and Exit

Security Menu


Phoenix SecureCore(tm) Setup Utility
Main Advanced Security Boot Exit
Item specific Help
Supervisor Password Is: Clear
Set Supervisor Password: [Enter]
F1 Help ↑↓ select item F5/F6 change values F9 Setup defaults
Esc Exit ←→ select menu Enter Select ▸ Sub-Menu F10 Save and Exit

Set Supervisor Password

Enter this field always shows the message.

While this field is highlighted, then press “Enter” the following message is shown:

Set Supervisor Password
Enter New Password [ ]
Confirm New Password [ ]

If there is an old password then setup will prompt with the following window instead and a current password will be required to be entered at first:

Set Supervisor Password
Enter current password [ ]
Enter New Password [ ]
Confirm New Password [ ]

User can type password in field of enter new password”, and re-enter password in field of “confirm new password “ for verification.

If verification OK:

Setup Notice
Changes have been saved.
[Continue]

The supervisor password is set complete after user press enter”

If verification fail:

Setup Warning
Password does not match
Re-enter Password
[Continue]

If password on boot is required, the password must be set otherwise it cannot be enabled.

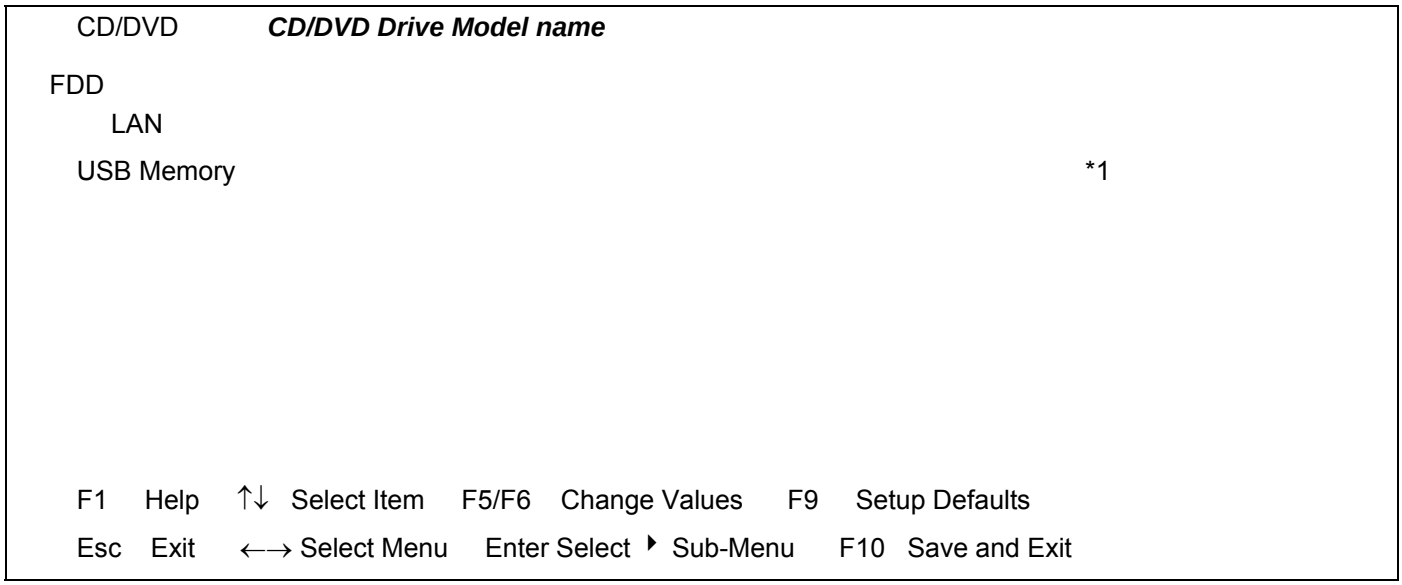
The formats of the password are as follows:

Length No more than 8 characters.

Characters Alphanumeric keys only. The shift status i.e. Ctrl, Shift, Alt, and Capital are ignored.

10.2.3 Boot Menu

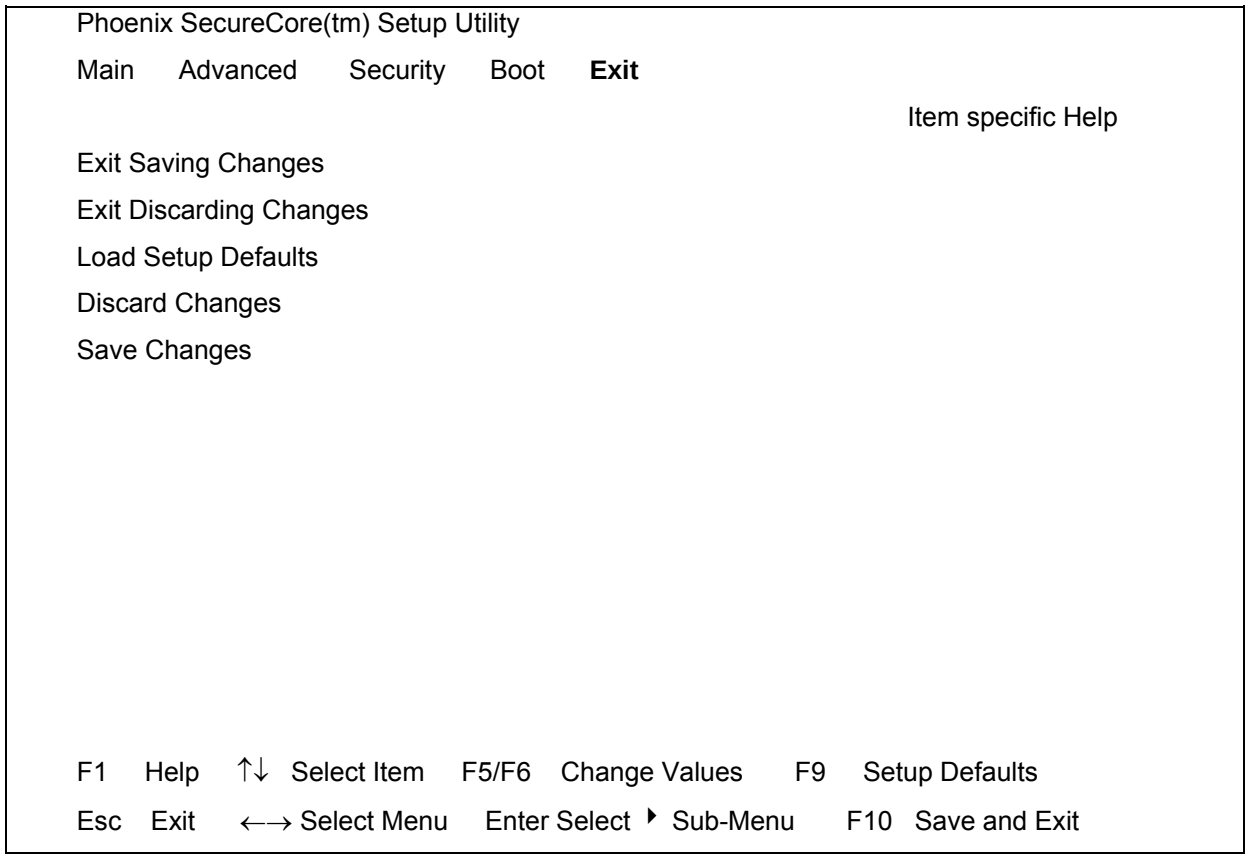
Phoenix SecureCore(tm) Setup Utility					
Main	Advanced	Security	**Boot**	Exit	
					Item specific Help
HDD1/SSD1	***Hark Disk Model name***				*1


CD/DVD
CD/DVD Drive Model name
FDD
LAN
USB Memory
*1
F1 Help ↑↓ Select Item F5/F6 Change Values F9 Setup Defaults
Esc Exit ←→ Select Menu Enter Select ▸ Sub-Menu F10 Save and Exit

*1 : The menu will show up, if the device is available.

This menu allows the user to decide the order of boot devices to load the operating system. Bootable devices include the diskette drive in module bay, the onboard hard disk drive and the CD-ROM in module bay.

Exit Menu


Phoenix SecureCore(tm) Setup Utility
Main Advanced Security Boot Exit
Item specific Help
Exit Saving Changes
Exit Discarding Changes
Load Setup Defaults
Discard Changes
Save Changes
F1 Help ↑↓ Select Item F5/F6 Change Values F9 Setup Defaults
Esc Exit ←→ Select Menu Enter Select ▸ Sub-Menu F10 Save and Exit

Exit Saving Changes

Allows the user to save changes to CMOS and reboot system. The following message is prompted when user press “Enter” on the item.

Setup Confirmation
Save configuration changes and exit now?
[Yes] [No]

Yes: Exit SETUP and reboot

No: Back to previous screen

Exit Discarding Changes

Setup Warning
Configuration has not been saved!
Save before exiting?
[Yes] [No]

Load Setup Defaults

Allows the user loads default value in CMOS Setup. The following message is prompted when user press “Enter” on this item:

Setup Confirmation
Load default confirmation now?
[Yes] [No]

It still stay in Setup when press a key.

Discard Changes

Allows the user loads previous value in CMOS Setup. The following message is prompted when press “Enter” on this item:

Setup Confirmation
Load previous configuration now?
[Yes] [No]

It still stay in Setup when press a key.

Save Changes

Allows the user to save changes and not exit Setup. The following message is prompted when press “Enter” on this item:

Setup Confirmation
Save configuration changes now?
[Yes] [No]

It still stay in Setup when press a key.

11. OS Compatibility

Netbook XP

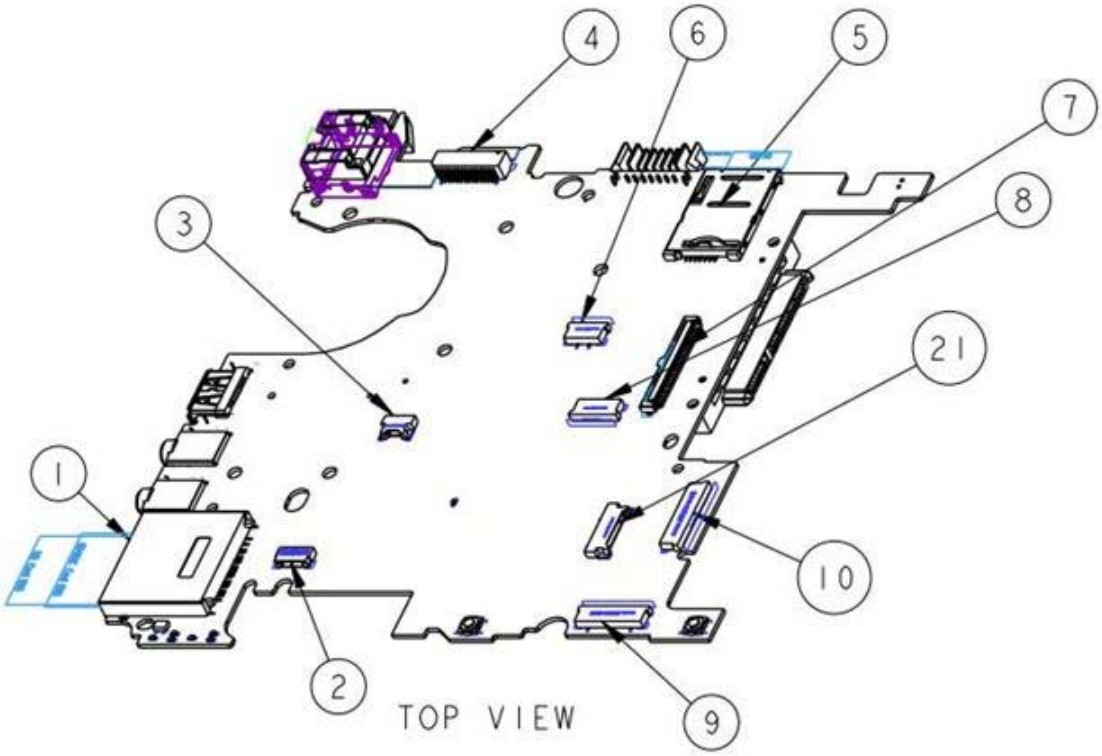
OS Compatibility : [Win7]

Chapter 3
Hardware

1. Major Sub-assembly Specification

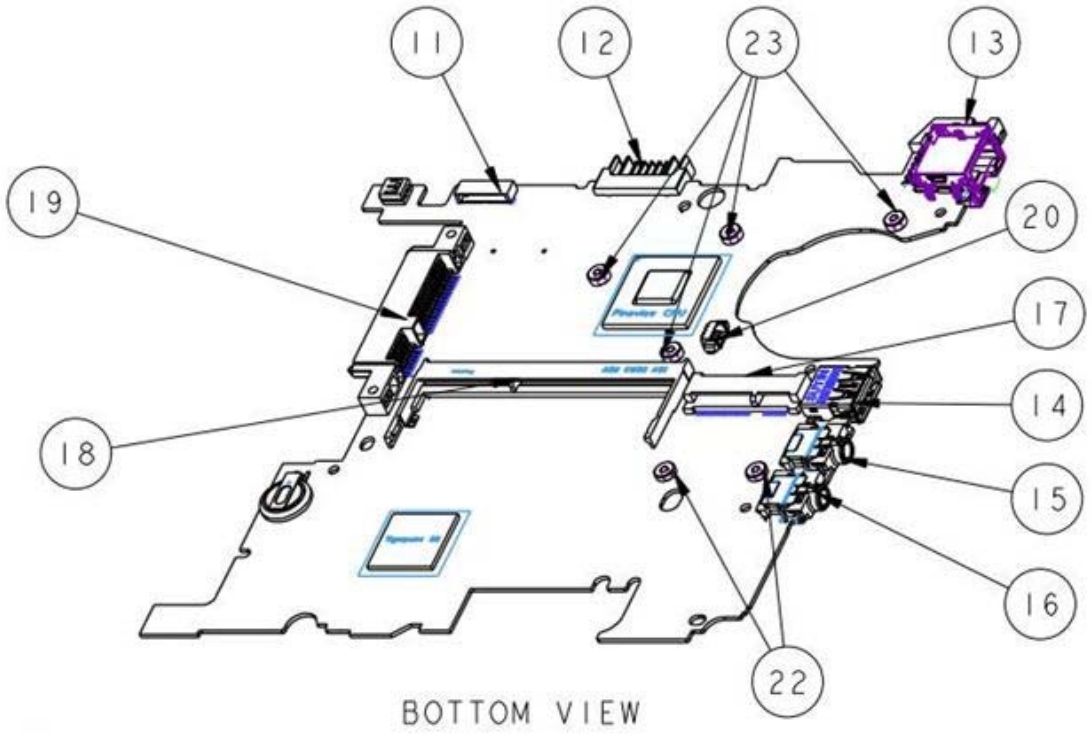
System interconnection (For NTV00)

1.1 Top View



NO	Description
	CARD READER
2	SPEAKER Conn
3	Internal Mic Conn
4	LVDS
5	SIM Card Conn
6	Power Board Conn
7	K/B to MLB
8	T/P Module to MLB
9	Usb Board to MLB
10	3G Moudle
21	B/T TO MLB

1.2 Bottom view



NO	Description	NO	Description
11	D-sub cable to MLB	20	FAN to MLB
12	Battery Conn	22	MINICARD_H15_STANDOFF
13	RJ45	23	THERMAL_H20_STANDOFF
14	USB Conn		
15	Audio Jack (MIC for PINK)		
16	Audio Jack (headphone for GREEN)		
17	Mini PCI Express		
18	DDRIII SOCKET		
19	SATA HDD CONN		

Chapter 4
DC-DC CONVERTER

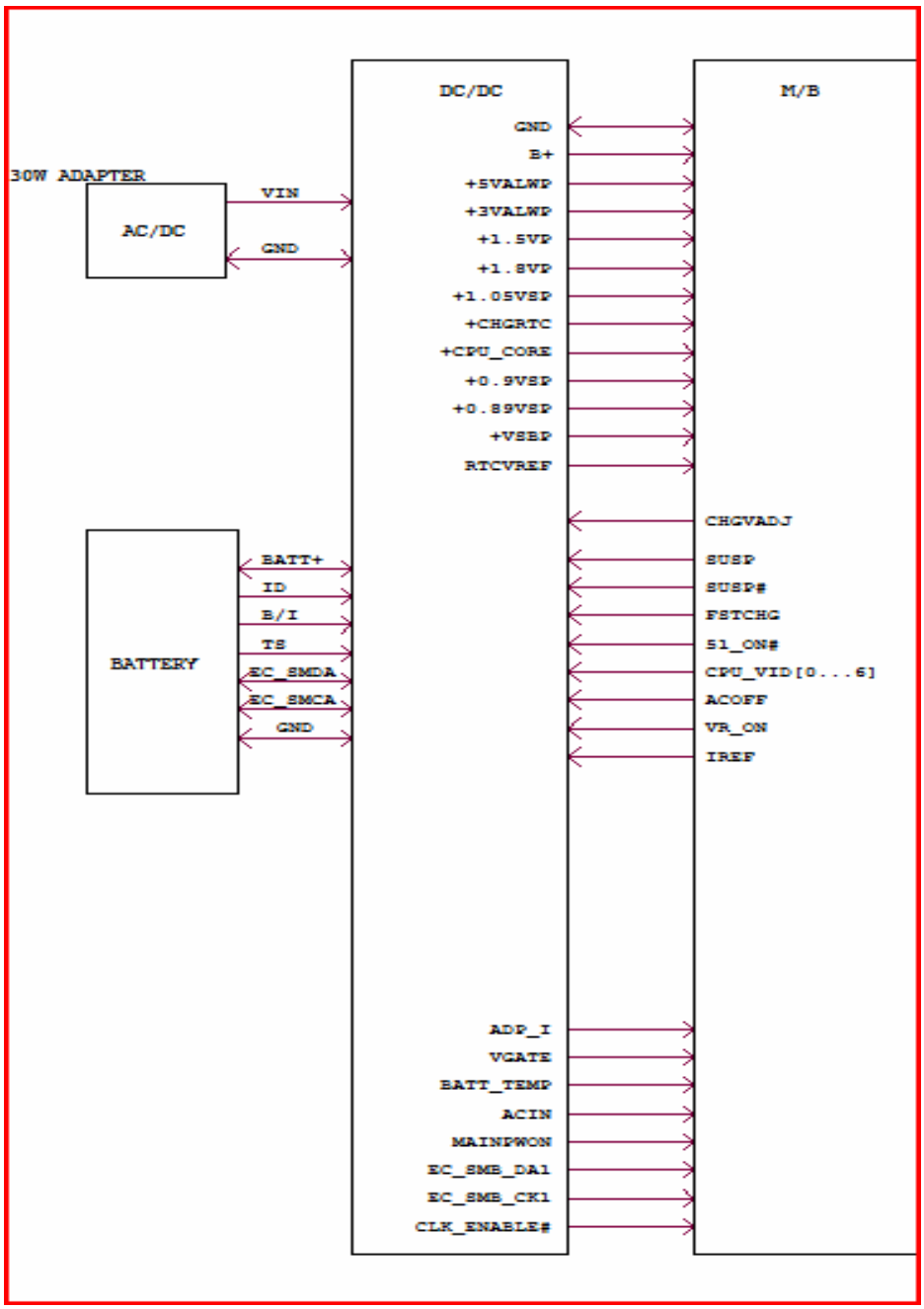
1. Power

3 cells Li-Ion 18650 size smart battery Pack with 24.975 Wh (3.7*2.25) capacity

6 cells Li-Ion 18650 size smart battery Pack with 49.95 Wh (3.7*4.5) capacity

2. DC-DC CONVERTER

NTV00 Series Power System block diagram



2.1. NTV00Adapter Description

This specification defines the performance and characteristic of 30W AC adapter power supply. It supplies a constant voltage 19V output source for NTV00 series notebook computer.

2.2 Feature

- Accepts universal input from 90V $_{AC}$ to 264V $_{AC}$
- Offers constant Voltage 19V output source with 30W max output power capacity.
- High efficiency 85% min at 100~240Vac
- Compact Size

2.3 Adapter Electrical Specification

2.3.1 Input Voltage range: universal input, 90VAC to 264VAC

2.3.2 Inrush current: less than 50A with No damage.

2.3.3 Input frequency range: 47~63Hz

2.3.4 Input Current: 0.8Amax at 100VAC

2.3.5 Start-up time: ≤ 5sec Max. @115 and 230 Vac, full load

2.3.6 HOLD-UP time: >10ms@115VAC, full load condition

2.3.7 OVP: less than 26V with No damage and automatic shut down

2.3.8 Short circuit protection: Output can be shorted without damage, and auto recovery

2.3.9 OUTPUT Voltage Regulation: 18.5-20V including the effects of line Voltage variation, load current, ripple and noise

2.3.10 OUTPUT Current: Current: 0Amin, 1.58Amax continuous

2.3.11 OUTPUT Voltage ripple: 250mv PK-PK for resistor load.

2.3.12 OUTPUT Voltage Dynamic regulation: Output voltage within18.5-20V, load current 10%←→100%, frequency 100Hz, 50% duty cycle, recover time ≤ 1msec.

2.3.13 DC OUTPUT PIN OUT:

PIN1	Center Pin Adapter +output
PIN2	Barrel (Ring) Adapter returns.

2.3.14 Temperature Range:

Operating temperature:	0 °C TO 40 °C
Storage temperature:	-20 °C TO 65 °C

2.3.15 NTV00 Adapter Description

This specification defines the performance and characteristic of 30W AC adapter power supply. It supplies a constant voltage 19V output source for NTV00series notebook computer.

2.3.16 Feature

Accepts universal input from 90V AC to 264V AC

Offers constant Voltage 19V output source with 30W max output power capacity.

Meet EPA Energy Star level-5 requirement

Compact Size

2.4 Electrical Specification

2.4.1 Input Voltage range: universal input, $90V_{AC}$ TO 264_{AC}

2.4.2 Inrush current: less than 50A with No damage.

2.4.3 Input frequency range: 47~63Hz

2.4.4 Input Current: 1.0Amax at $100V_{AC}$

2.4.5 Start-up time: ≤ 5sec Max. @115 and 230 Vac, full load

2.4.6 HOLD-UP time: >10ms@115VAC, full load condition

2.4.7 OVP: less than 26V with No damage and automatic shut down

2.4.8 Short circuit protection: Output can be shorted without damage, and auto recovery

2.4.9 OUTPUT Voltage Regulation: 18.5-20V including the effects of line Voltage variation, load current, ripple and noise

2.4.10 OUTPUT Current: 0Amin, 1.58Amax continuous

2.4.11 OUTPUT Voltage ripple: 250mv PK-PK for resistor load

2.4.12 OUTPUT Voltage Dynamic regulation: Output voltage within18.5-20V, load current 10%←→100%, frequency 100Hz, 50% duty cycle, recover time ≤ 1msec.

2.4.13 DC OUTPUT PIN OUT:

PIN1 Center Pin Adapter +output

PIN2 Barrel (Ring) Adapter returns.

2.4.14 Temperature Range:

Operating temperature: 0 °C TO 40 °C

Storage temperature: -20 °C TO 65 °C

3. DC-DC CONVERTER

3.1 Description

The DC-DC converter is designed to supply the power for NTV00 series notebook computer of Compal. It supply +5VALWP, +3VALWP, +1.8V, +1.5VSP, +1.05VSP, +0.9VSP, +0.89VSP, for logical system, +CPU_CORE for CPU and supplies +3VALWP for the built-in KB926 microprocessor which handles the keyboard and PMU control functions of the system. The power ON/OFF is controlled by KB926. There is also a built-in charger power source. It can charge battery pack whether the computer is ON or OFF.

3.2 Features

3.2.1 High efficiency, up to 85% (using battery)

3.2.2 Accept wide range DC input voltage from 9V to 19V

3.2.3 Built-in charger power source

3.2.4 The power ON/OFF is controlled by software

3.3 Electrical specification

3.3.1 Input Voltage/Current

9V to19V at the summing point of AC-DC and battery

INPUT Current 3.375A max from 3-cell battery

INPUT Current 6.75A max from 6-cell battery

1.58A max from 30W AC-DC Adapter.

3.4 Temperature Range:

3.4.1 Operating temperature: 0° C to 40° C

3.4.2 Storage temperature range: -20° C to 65° CDC/DC OUTPUT

3.4.3 Fixed output voltage/Current

Item	+5VALWP	+3VALWP	+1.8VP
Nominal voltage	+5V	+3.3V	+1.8V
Min. current	0A	0A	0A
Max. Current	4.16A	4.32A	2.46A
Peak current	5.94A	6.17A	3.52A
Total regulation	5V±5%	3.3V±5%	1.8V±5%
Ripple voltage	100mVp-p max.	66mVp-p max.	36mVp-p max

Item	+1.5VSP	+0.89VSP	+ 1.05VSP
Nominal voltage	+1.5V	+0.89V	+1.05V
Min. current	0A	0A	0A
Max. Current	1.61A	1.85A	2.45A
Peak current	2.30A	2.64A	3.50A
Total regulation	1.5V±5%	0.89V±5%	1.05V±5%
Ripple voltage	30mVp-p max.	18mVp-p max.	21mVp-p max.

Item	+0.9VSP	+CPU_CORE
Nominal voltage	+0.9V	+1.024~+1.25V
Min. current	0A	0A
Max. current	0.21A	4.23A
Peak current	0.3A	6.04A
Total regulation	0.9V±5%	-5.8mv/A
Ripple voltage	18mVp-p max	20mVp-p max

3.5 VOLTAGE IDENTIFICATION CODES

VID6	VID5	VID4	VID3	VID2	VID1	VID0	VDAC
0	0	1	1	0	0	0	1.2000
0	0	1	1	0	0	1	1.1875
0	0	1	1	0	1	0	1.1750
0	0	1	1	0	1	1	1.1625
0	0	1	1	1	0	0	1.1500
0	0	1	1	1	0	1	1.1375
0	0	1	1	1	1	0	1.1250
0	0	1	1	1	1	1	1.1125
0	1	0	0	0	0	0	1.1000
0	1	0	0	0	0	1	1.0875
0	1	0	0	0	1	0	1.0750
0	1	0	0	0	1	1	1.0625
0	1	0	0	1	0	0	1.0500
0	1	0	0	1	0	1	1.0375
0	1	0	0	1	1	0	1.0250
0	1	0	0	1	1	1	1.0125
0	1	0	1	0	0	0	1.0000
0	1	0	1	0	0	1	0.9875
0	1	0	1	0	1	0	0.9750
0	1	0	1	0	1	1	0.9625
0	1	0	1	1	0	0	0.9500
0	1	0	1	1	0	1	0.9375
0	1	0	1	1	1	0	0.9250
0	1	0	1	1	1	1	0.9125
0	1	1	0	0	0	0	0.9000
0	1	1	0	0	0	1	0.8875
0	1	1	0	0	1	0	0.8750
0	1	1	0	0	1	1	0.8625
0	1	1	0	1	0	0	0.8500
0	1	1	0	1	0	1	0.8375
0	1	1	0	1	1	0	0.8250
0	1	1	0	1	1	1	0.8125
0	1	1	1	0	0	0	0.8000
0	1	1	1	0	0	1	0.7875
0	1	1	1	0	1	0	0.7750
0	1	1	1	0	1	1	0.7625
0	1	1	1	1	0	0	0.7500
0	1	1	1	1	0	1	0.7375
0	1	1	1	1	1	0	0.7250

0	1	1	1	1	1	1	0.7125
1	0	0	0	0	0	0	0.7000

3.6 Charger

3.6.1 Controlled by KB926 microprocessor from motherboard

3.6.2 Temperature sense capability for the battery (charge active between 0°C~ 50°C)

3.6.3 Fast charge current 1.5Amps (max.) for Li-Ion Battery at system off, approach 28.5(19*1.5) W fast charge at system ON. (Depend on system load)

3.6.4 Trickle charge: Typical 500mA pre-charge current for Li-Ion Battery. All trickle charge are controlled by KB926.

3.6.5 Charge termination: When Fully-Charge bit is set, charger is terminated by KB926

3.6.6 When system turns off, the charged time from empty to full be 3 hrs typically and 3.5.0hrs maximum for Li-ION battery.

3.6.7 Other battery services are presented by KB926 microprocessor includes maximum charging timer, charging temperature range etc.

3.6.8 Charger power:

Constant current mode: 1.58A±8%

Constant adapter current mode: 1.58A±7% (For 30W system)

BATT+ Constant Voltage mode: 12.6V±1% for 3cell/6 cell Li-Ion battery.

3.7 OVER Current protection:

+5VALWP: 6.37A(min.)
+3VALWP: 6.43A(min.)
+1.8V: 6.37A(min.)

+0.89VSP: 5.92A

+1.05VSP: 6.01A

+CPU_CORE: 10.169A (min.)

3.8 OVER Voltage protection:

+5VALWP: 5V *(112.5% ~ 117.5%)

+3VALWP: 3.3V *(112.5% ~ 117.5%)

+1.05VSP: 1.05V*(110% ~ 120%)

+1.8VSP: 1.8V*(110% ~ 120%)

+0.89VSP: 0.89V*(110% ~ 120%)

+CPU_CORE over 160mV of programmed VID level

3.9 Under voltage protection

+5VALWP: 5V *(65% ~ 75%)

+3VALWP: 3.3V *(65% ~ 75%)

+1.05VSP: 1.05V*(65% ~ 75%)

+1.8VSP: 1.8V*(65% ~ 75%)

+0.89VSP: 0.89V*(65% ~ 75%)

+CPU_CORE Under 230mV programmed VID level

3.10 Short circuit protection:

Latch mode for+5VALWP,+3VALWP,,+CPU_COREP

3.11 I/O

3.11.1 DC-Jack

Pin 1: Center pin Adapter power +input

Pin 2: Barrel (Ring) Adapter power return

3.11.2 Battery Connector

Pin 1: BATT++

Pin 2: ID

Pin 3: B/I

Pin 4: TS

Pin 5: EC_SMDA (SMD)

Pin 6: EC_SMCA ((SMC)

Pin 7: GND

3.11.3 Interface between Powers with M/B

Item	**Description**	**I/O**
SUSP	High Active, system suspend control signal	I
SUSP#	Low Active, system suspend control signal	I
SYSON	High Active, KB926 use this pin to control the SYSON signal	I
51_ON#	Low Active, POWER ON control signal	I
FSTCHG	High Active, Charger enables signal.	I
IREF	A/D signal, Control charging current	I
ACIN	High Active, provide KB926 to mean the Adaptor power is present	O
VGATE	High Active, the signal is CPU_CORE power good pin	O
VR_ON	High Active, turn on/off the +CPU_CORE	I
CLK_ENABLE#	Low Active, enable clock generator	O
ACOFF	High Active, turn on/off the Battery discharge	I
BATT_TEMPA	Analog signal, KB926 using this voltage level to calculate battery's temperature	O
VID [0..6]	The +CPU_CORE voltage depends on those PINs VID[6..0]	I
CHGRTC	Charge RTC-battery power source	O
EC_SMB_DA1	SMbus data interface	I/O
EC_SMB_CK1	SMbus clock interface	I/O
MAINPWON	H/W Thermal protection	O

3.12 BATTERY

3.12.1 Li-ion Smart battery for NTV00

18650 3S1P 11.1V/2250 mAH

18650 3S2P 11.1V/4500 mAH

More than 300 charging/discharging cycles.

Modularized battery pack, easy to be replaced.

3.12.2 Battery Specification

1-1. EE information

	3 cell	6 cell	
Battery Design Capacity(mAH)	2250	4500	Battery Design Capacity(mAH)
Battery Configuration	3S1P	3S2P	Battery Configuration
Battery Nominal Voltage(V)	11.1	11.1	Battery Nominal Voltage(V)
Single Cell Chemistry	Li-ion	Li-ion	Single Cell Chemistry
Single Cell Type	18650	18650	Single Cell Type
Single Cell Capacity(mAH)	2250	2250	Single Cell Capacity(mAH)
Dumb/Smart Battery	Smart Battery (SMBus ver. 1.1.)	Smart Battery (SMBus ver. 1.1.)	Dumb/Smart Battery
Cycle Life	300cycle 70%	300cycle 70%	Cycle Life
Nominal Charging Voltage(V)	12.6	12.6	Nominal Charging Voltage(V)
Nominal Charging Current(A)	1.575	3.150	Nominal Charging Current(A)
Protection Function	OVP UVP OTP OCP	OVP UVP OTP OCP	Protection Function

1-2. Battery Connector Pin Assignment

Connector Male on M/B: ALLTOP-C144U2

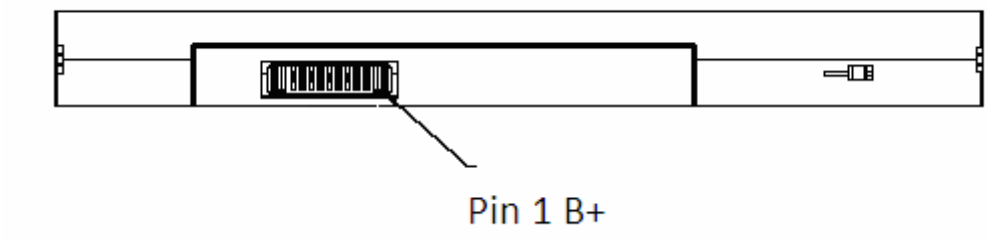
Connector Female on Battery: ALLTOP-C144U1

Pin No.	Symbol	Comments
7	GND	Battery Negative Terminal.
6	SMC	SMBus clock interface I/O pin.
5	SMD	SMBus data interface I/O pin.
4	TS	Connect to thermister(Note 3)
3	B/I	Battery-In Pin(Note 2)
2	ID	Identify pin(Note 1)
1	BATT+	Batt+, Battery Positive Terminal.

Note: 1. ID pin must be floating.

2.The battery can be charged/discharged only while this pin is connected to GND by the system.

3.Thermister: DTN-C103F3H-SYS115A (or 103AT2 equivalent). The other thermister Pin is connected GND.



3.12.3 2.6.12.2 On board RTC battery: Maxell ML1220T13RE /3.0V /14mAH Lithium.
3.12.4 2.6.12.3 Sanyo ML1220T28 /3.0V /15mAH Lithium

4. Safety Protection

4.1 Open lamp protection:

When inverter is on open lamp status, any component on inverter should be O.K and inverter is no damaged, no fire and no arcing. If inverter can't shunt down during open lamp happen, inverter must pass below conditions:

i.) Human body test.
ii.) Open lamp burning: Inverter burns for 24 hours at open lamp status. No parts damage.

4.2 Human body safety test:

Short inverter output, transformer secondary output to GND by a 2KΩ resistor which connects one end to GND and another one to those outputs. They should meet output current limitation requirement as follow. Output current I is the current that flows through 2KΩ resistor.

1. Output current $I \leqq 0.7mA$, if frequency $f \leqq 1KHz$
2. Output current $I \leqq 0.7mA * f (kHz)$, if $f \geqq 1KHz$.

However, output current should be less than 70mA even frequency is more than 100KHz.

4.3 Abnormal test:

Any one component is short or open; inverter should be no fire, no arcing. And result must meet output current limitation requirement.

Chapter 5
Disassembly Guide

1. Disassembling the Base Unit

These are the directions for disassembling the base unit. You will need a 5.5mm Nut Driver, a medium size Philips screwdriver.

These directions are to disassemble the complete unit and are cross-referenced to Chapter 7 for the replacement of component parts.

Before disassembly, make sure the notebook is powered off.

1.1 Removing the Battery Module

To remove the battery pack from the battery bay, follow the steps below:

1.1.1 Turn the notebook upside down.

1.1.2 Slide the battery lock to unlock the battery pack.

1.1.3 Slide the battery release latch in the direction of the arrow; gently pry the battery pack from its housing.

***NOTE**: Always start laptop disassembly by removing the battery pack first.*

1.2 Removing the HDD Module

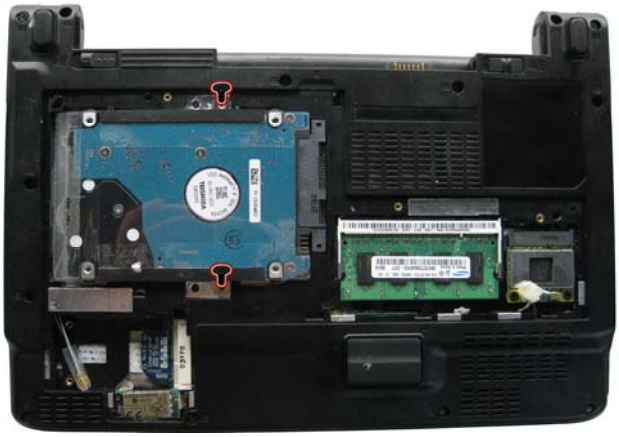
Follow the steps below to remove the HDD module:

1.2.1 Turn the notebook upside down.

1.2.2 Remove the 3 M2.0x3 screws securing the bottom cover.

1.2.3 Pull up the bottom cover in the direction of the arrow.

1.2.4 Remove the two M2.0x3 screws securing the HDD module in place.



1.2.5 Pull the tab to remove the HDD module in the direction of the arrow.

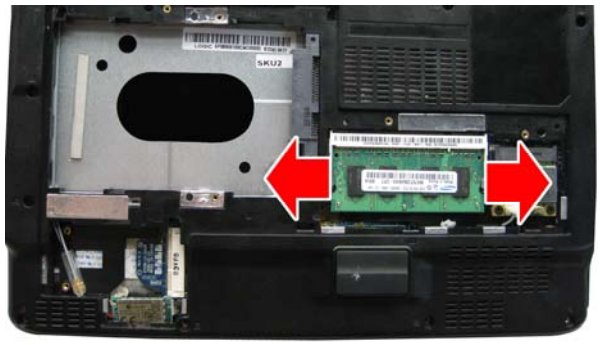
1.2.6 Remove the four M2.0x3 screws to take off the HDD case.

1.2.7 Remove the HDD module from the HDD case.

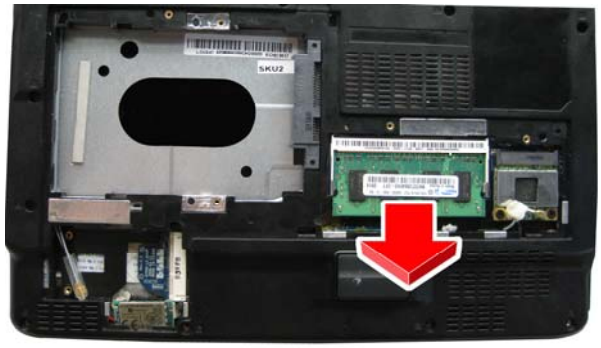
1.3 Removing the RAM Module

Follow the steps below to remove the HDD module:

1.3.1 Push the latches of the RAM socket. The module will be released and pop up.



1.3.2 Grasp the module and pull it out.

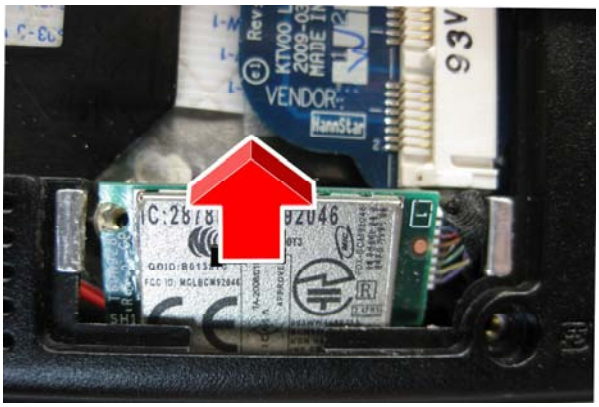


1.4 Removing Bluetooth Card

To remove the Bluetooth card, firstly remove the HDD door, then follow the steps below:

1.4.1 Remove the 1 M2.0x3 screw as shown:

1.4.2 lift out the Bluetooth card:

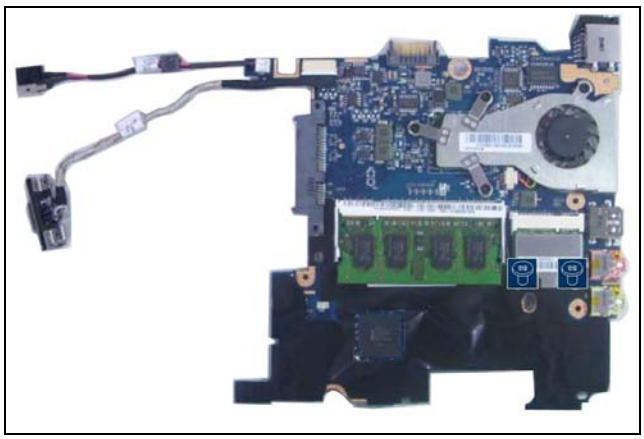


1.5 Removing the Wireless LAN Card

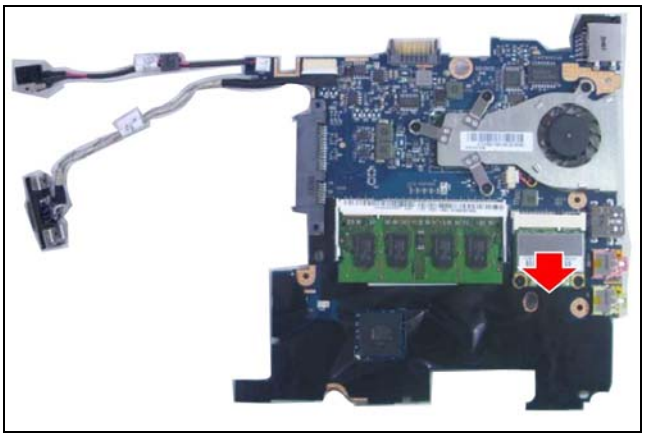
To remove the wireless LAN card, first remove the HDD door. Then follow the steps below:

1.5.1 Disconnect the two antennas from the Wireless Lan card.

1.5.2 Turn over the motherboard and remove the two M2x3 screws securing the wireless card to the motherboard.



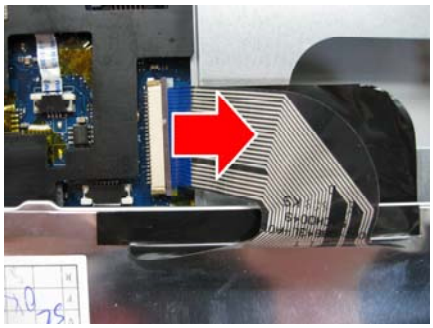
1.5.3 Remove the wireless card.



1.6 Removing the Keyboard

1.6.1 Lift up the keyboard from bottom side.

1.6.2 Pull the keyboard towards you, revealing the keyboard cable underneath.



1.6.3 Lift and remove the keyboard.

1.7 Removing the Logic Upper

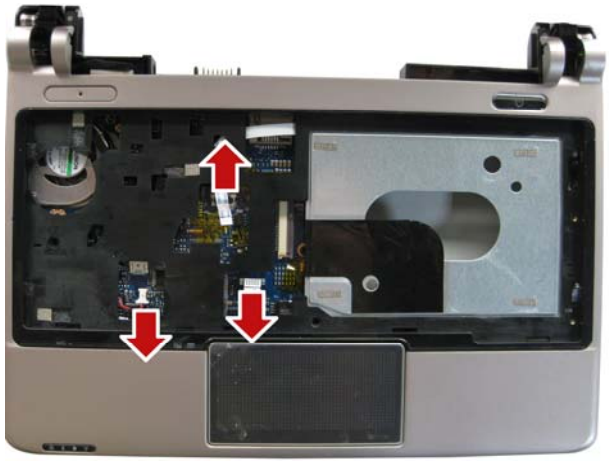
To remove the logic upper, first remove the battery pack, HDD, RAM, keyboard, wireless LAN card. Follow the steps below to remove the logic upper.

1.7.1 Turn the notebook upside down and remove the 8 M2.0x5 screws from the bottom side of the notebook.

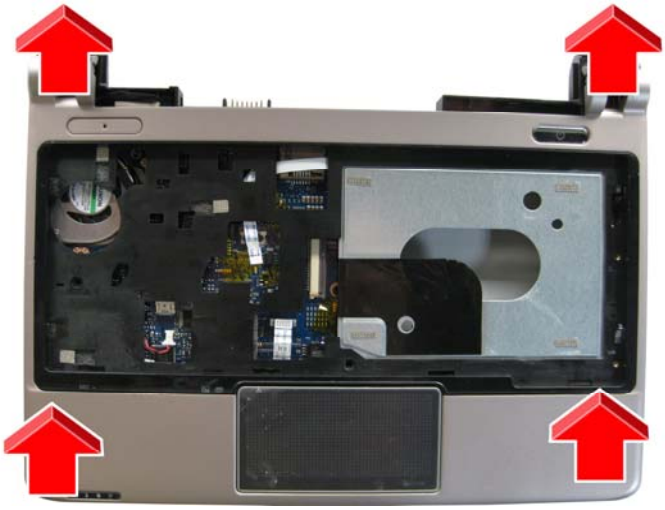
1.7.2 Remove the 5 M2.0x3 screws from the lower side as shown.

1.7.3 Turn the notebook over and remove the 2 M2.0x5 screw attaching the logic upper to the motherboard.

1.7.4 Disconnect the MIC and fingerprint cables as shown.

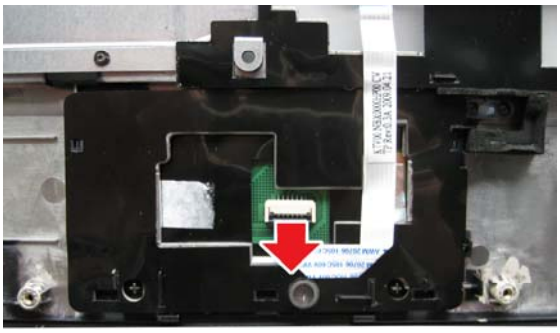


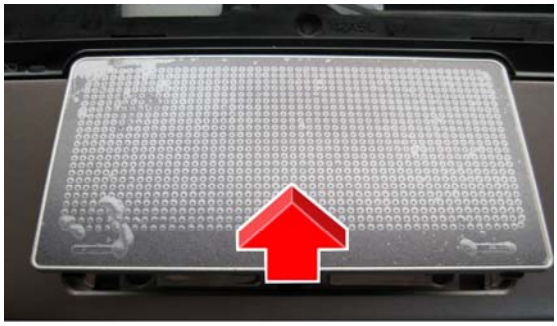
1.7.5 Lift off the logic upper.（detail information please refer to the reference）



1.7.6 Remove power board, loose two M2.0x5 screw to release the power board.

1.7.7 Remove TP module.

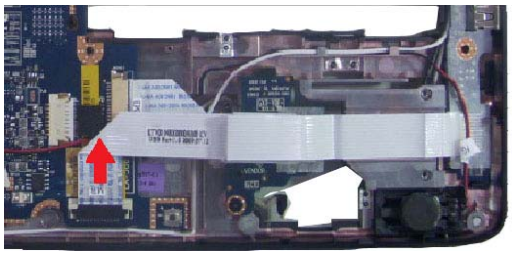




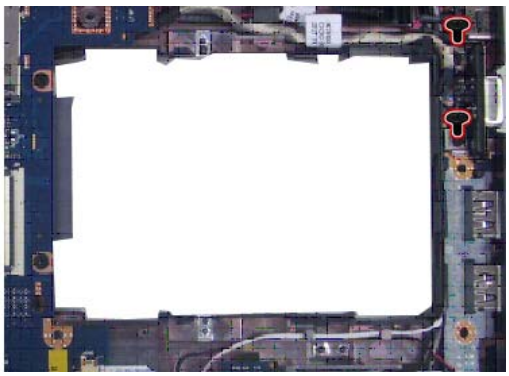
1.8 Removing the USB Board

To remove the USB board, first remove the logic upper. Then follow the steps below:

1.8.1 Release the USB FFC as shown:



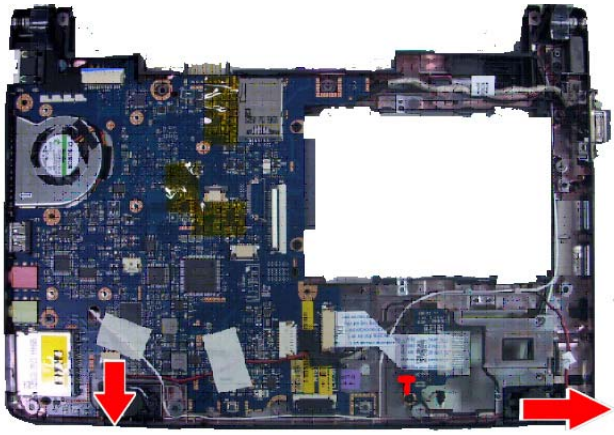
1.8.2 Loose two M2.0x3 screw & remove the USB board as shown:



1.9 Removing the Speaker

To remove the speaker, first remove the logic upper. Then follow the steps below:

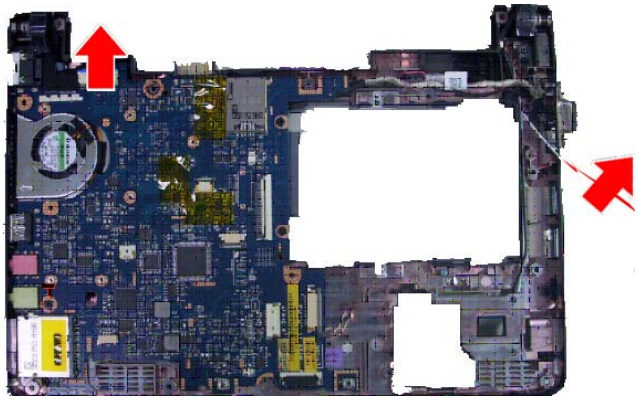
1.9.1 Lift out the speaker & loose screw as shown.



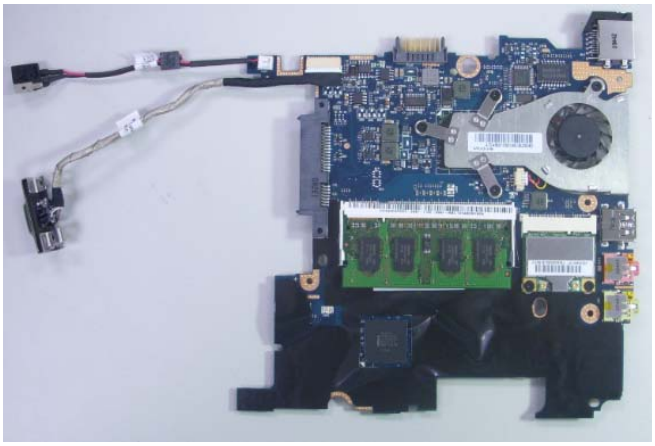
1.10 Removing the Motherboard

To remove the motherboard, first remove the logic upper. Then follow the steps below:

1.10.1 Disconnect the antennas, daughters and LVDS cable as shown below:



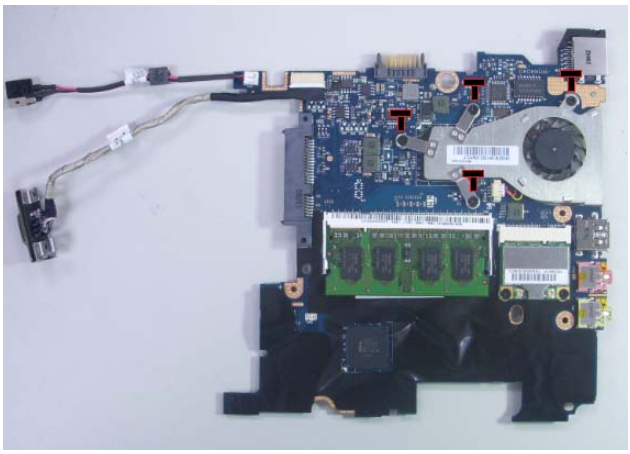
1.10.2 Lift out the motherboard.



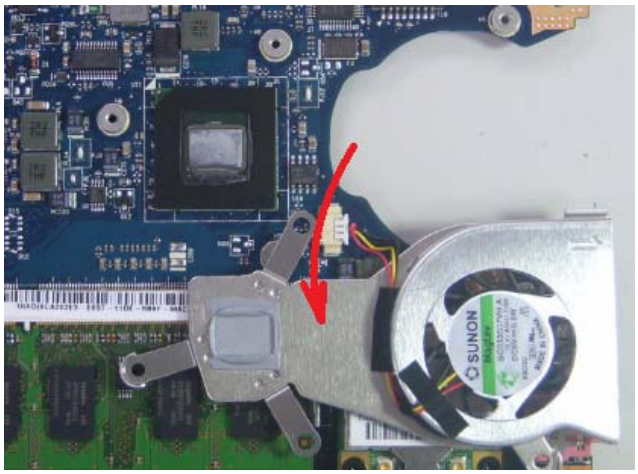
1.11 Removing Thermal module

To remove the thermal module, first remove the MB(with thermal and memory. Then follow the steps below:

1.11.1 Remove the 4 M2.0x3 screw on MB ASSY.



1.11.2 Disconnect the fan connector from the motherboard as shown, and lift out the system fan.



CAUTION: *When you remove the thermal module, use the CPU grease tool to remove the grease on the CPU and thermal module. Reapply fresh grease before reinstalling the thermal module.*

1.12 Removing the LCD Module

To remove the LCD module, first remove the keyboard, and the function button board. Then follow the steps below:

1.12.1 Remove the two M2.0x5 screws on hinge front side.

1.12.2 Remove the LCD module.

1.13 Disassembling the Display

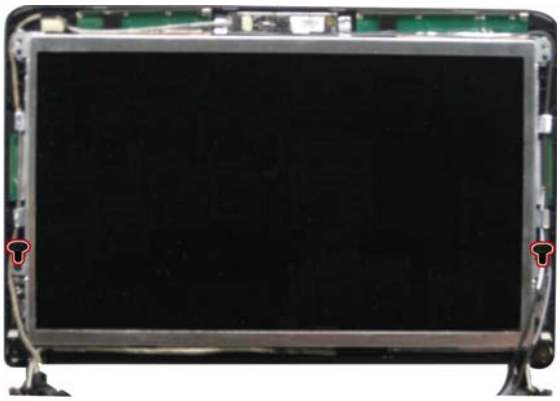
To disassemble the display and inverter board, first remove the LCD module. Then follow these steps:

1.13.1 Remove the four screw pads .

1.13.2 Remove the 4 M2.0x4 screws securing the LCD bezel to the LCD module.

1.13.3 Carefully insert your fingers between the display and the LCD bezel as indicated by the arrow, and gently pry up the LCD bezel.（detail information please refer to the reference）

1.13.4 Remove the 2 M2.0X3 screws mounting the display,



1.13.5 Gently lift out the display. Remove the four M2x3 screws securing the hinges to the display.

Panel

Cover

1.13.6 Disconnect the inverter cable from the back of the LCD panel.

1.14 Removing the Camera Module

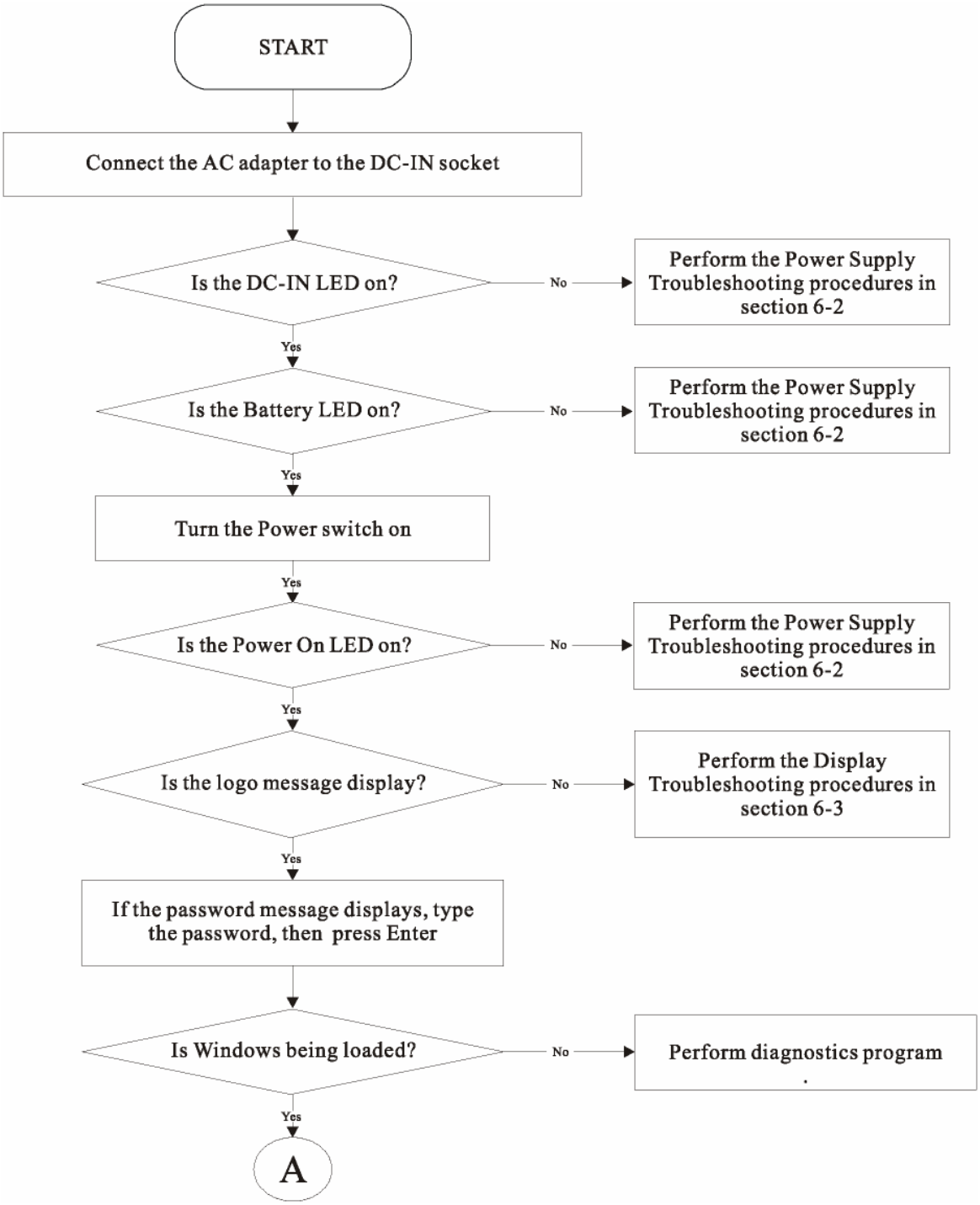
To remove the camera module, first remove the LCD module and lift out LCD display and inverter board. Then follow these steps:

1.14.1 Remove the camera module.

Chapter6 Testing and Troubleshooting

1. Testing and Troubleshooting

The purpose of this chapter is to provide a systematic method of isolating problems you may have with the NTV00 series Notebook Computer. We assume that you have a basic understanding of



DOS-based computer systems as well as knowledge of standard troubleshooting procedures. This manual is written under the assumption that the problems are indeed related with Notebook itself. The improper usage and application software problems are excluded in this chapter. The system BIOS Beep Code is an integrated unit to detect some errors in the system board. This beep code will give

immediate identification of certain system board problems. If the troubleshooting procedure is followed step by step, it can efficiently isolate the problem and the problem can be solved easily.

1.1 PERFORM VISUAL INSPECTION

Check the following:

- Power cords are properly connected and secured
- Power supply is adequate for operation
- There are no obvious shorts or opens
- There are no obviously burned or heated components
- All components appear normal

1.2 Troubleshooting Flowchart

Use the flowchart in Figure 6-1 as a guide for determining which troubleshooting procedures to execute. Before going through the flowchart steps, verify the following:

- Ask the user if a password is registered and, if it is, ask him or her to enter the password.
- Verify with the customer that windows XP is installed on the hard disk. Operating systems that were not preinstalled by Compal can cause the computer to malfunction.
- Make sure all optional equipment is removed from the computer.
- Make sure the floppy disk drive is empty.

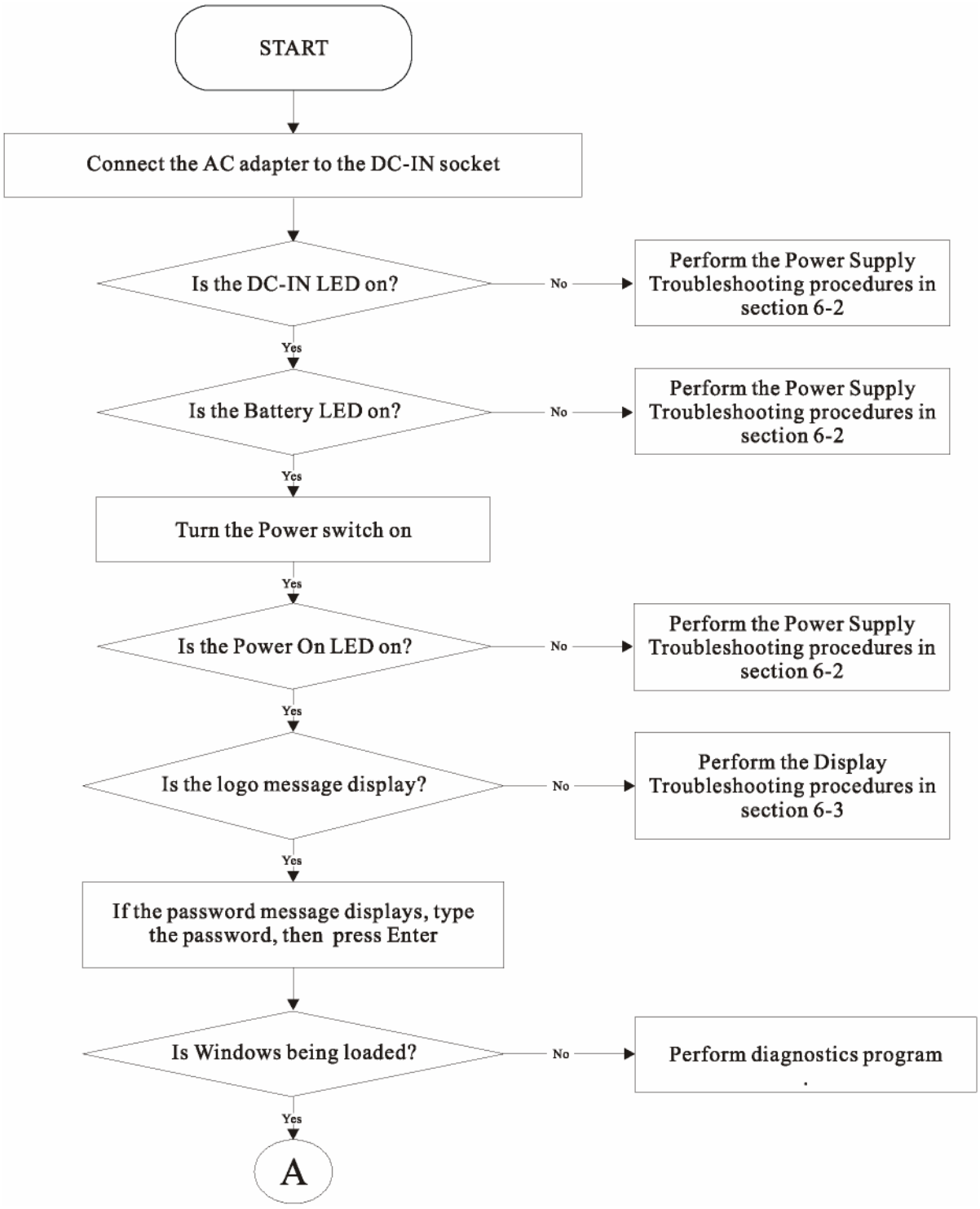


Figure 6-1 Troubleshooting flowchart (1/2)

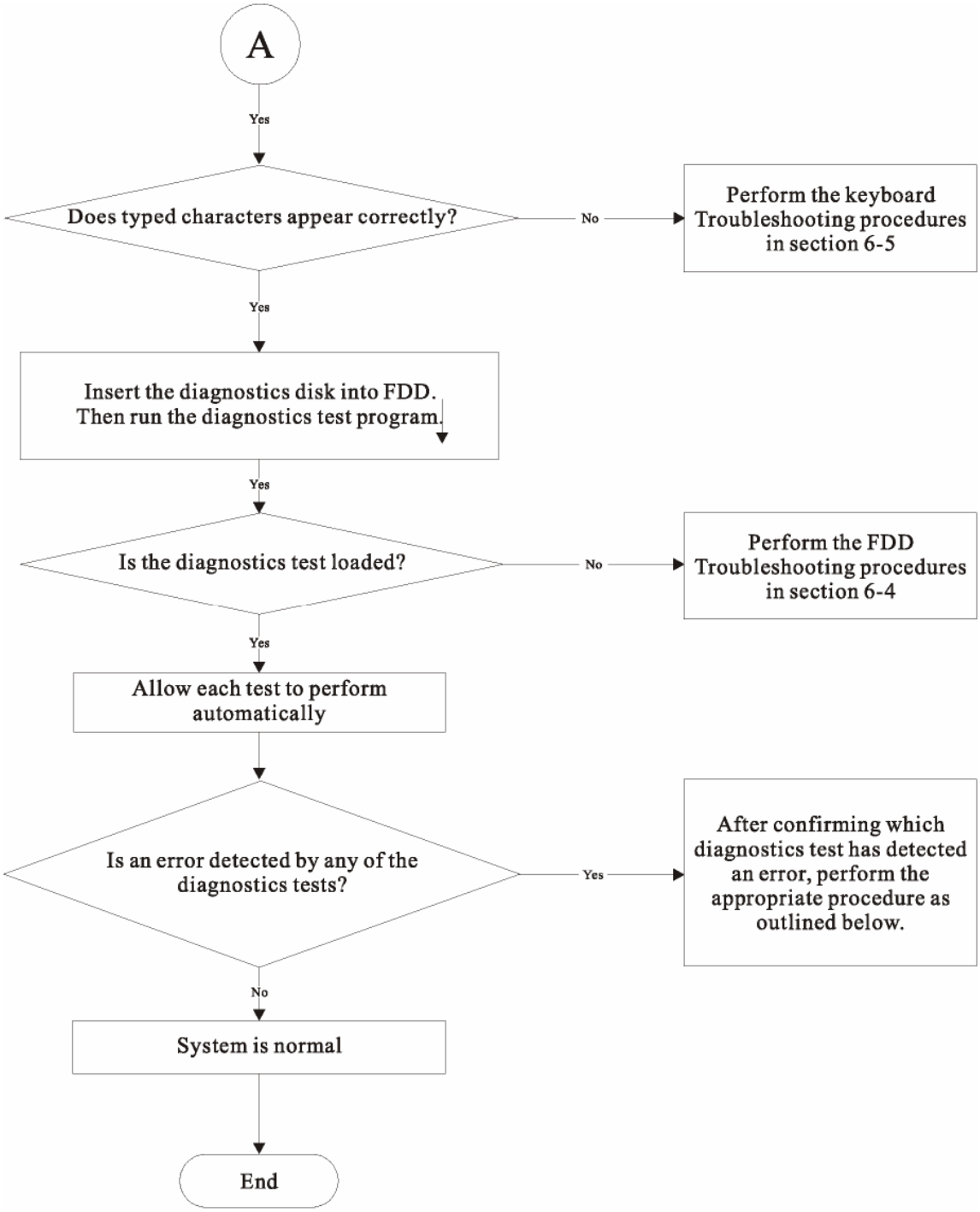

A
Yes
Does typed characters appear correctly?
No
Perform the keyboard Troubleshooting procedures in section 6-5
Yes
Insert the diagnostics disk into FDD. Then run the diagnostics test program.
Yes
Is the diagnostics test loaded?
No
Perform the FDD Troubleshooting procedures in section 6-4
Yes
Allow each test to perform automatically
Is an error detected by any of the diagnostics tests?
Yes
After confirming which diagnostics test has detected an error, perform the appropriate procedure as outlined below.
No
System is normal
End

Figure 6-1 Troubleshooting flowchart (2/2)

If the diagnostics program cannot detect an error, the problem may be intermittent. The test program should be executed several times to isolate the problem. When a problem has been located, perform the appropriate troubleshooting procedures as follows:

- If an error is detected by the main battery test, perform the Power Supply Troubleshooting procedures in Section 6-2.
- If an error is detected by the display test, perform the Display Troubleshooting procedures in Section 6-3.
- If an error is detected by the keyboard test, perform the Keyboard Troubleshooting procedures in Section 6-4.
- If an error is detected when using an external USB device, perform the External USB Devices Troubleshooting procedures in Section 6-5.
- If an error is detected when using the CRT connection, perform the CRT Failure Troubleshooting procedures in Section 6-6.
- If an error is detected when using the touch pad, perform the Touch Pad Troubleshooting procedures in Section 6-7.
- If an error is detected when using the speakers, perform the Speaker Troubleshooting procedures in Section 6-8.
- If an error is detected when using the Wireless LAN unit, perform the Wireless LAN Troubleshooting procedures in Section 6-9.

Power Supply Troubleshooting

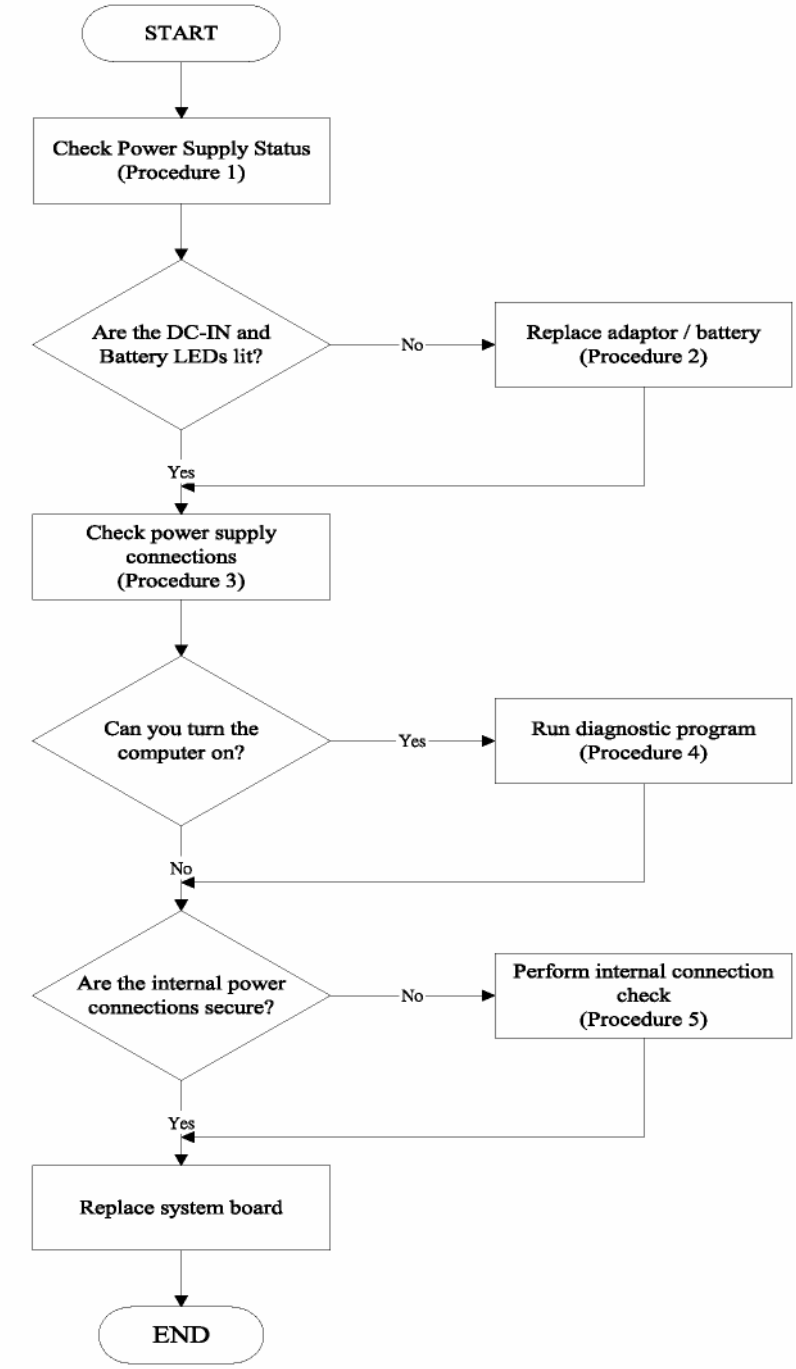


Figure 6-2 Power Supply Troubleshooting Process

The power supply controls many functions and components. To determine if the power supply is functioning properly, start with Procedure 1 and continue with the other Procedures as instructed. The flowchart in Figure 6-2 gives a summary of the process.

The procedures described in this section are:

- Procedure 1: Power status check
- Procedure 2: Adaptor / battery replacement
- Procedure 3: Power supply connection check
- Procedure 4: Diagnostic check
- Procedure 5: Internal connection check

Procedure 1 Power Status Check

The following LEDs indicate the power supply status:

Battery LED

The power supply controller displays the power supply status through the Battery and the POWER LEDs as listed in the tables below.

- **Table 2-1 Battery LED**

Battery State	LED colors	Definition
Charging	blue, blinking	Battery charging with AC
	blue, solid on	Battery fully charged by AC
	color off	Battery abnormal: stop charging with AC (Bad cell/ Overheated)
Discharging	Amber, blinking LED on for 1 second every 4 seconds	Battery within low state: 12 minutes remaining
	Amber, blinking (LED on 1 second every 2 seconds)	Battery within critical low state: 3 minutes remaining. The system is protected and cannot be re-powered on without the AC power connected.
	Color off	Battery not in low or critical low state; in discharging state

- **Table 2-2 POWER LED**

Power supply status	POWER LED
System Power On (LED is solid blue).	blue Solid on
System Suspended	Blue blinking
System Power Off.	Off

To check the power supply status, install a battery pack and connect an AC adaptor to the DC-IN port on the computer and to a power supply.

If the Battery LED is not lit, go to Procedure 2

Procedure 2 Adaptor / battery replacement

A faulty adaptor may not supply power or may not charge the battery.

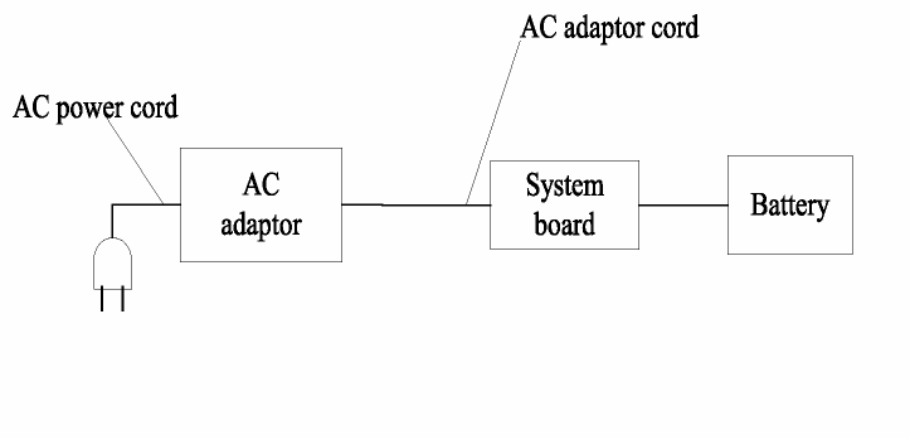
Perform Check 1.

Check 1 Connect a new AC adaptor. If the problem is not resolved, go to Check 2.

Check 2 Insert a new battery. If the problem is still not resolved, go to Procedure 3.

Procedure 3 Power supply connection check

The power supply wiring diagram is shown below:



Any of the connectors may be disconnected. Perform Check 1.

Check 1

Disconnect the AC power cord from wall outlet. Check the power cable for breaks.

- If the power cord is damaged, connect a new AC power cord.
- If there is no damage, go to Check 2.

Check 2

Make sure the AC adaptor cord and AC power cord are firmly plugged into the DC-IN socket, AC adaptor inlet and wall outlet.

- If these cables are connected correctly, go to Check 3.

Check 3

Make sure that the DC-IN input port socket is firmly secured to the system board of the computer.

- If the DC-IN input socket is loose, go to Procedure 5.
- If it is not loose, go to Check 4.

Check 4

Use a millimeter to make sure that the AC adaptor output voltage is close to 19 V.

- If the output is several percent lower than 19 V, go to Check 5.
- If the output is close to 19 V, go to Check 6.

Check 5

Connect a new AC adaptor or AC power cord.

- If the battery LED does not light, go to Check 6.

Check 6

Make sure the battery pack is installed in the computer correctly.

- If the battery is properly installed and the battery LED still does not light, go to Procedure 4.

Procedure 4 Diagnostic check

The power supply may not charge the battery pack. Perform the following procedures:

- Reinstall the battery pack.
- Attach the AC adaptor and turn on the power. If you cannot turn on the power, go to Procedure 5.
- Run the Diagnostic test following the procedures described Tests and Diagnostics. If no problem is detected, the battery is functioning normally.

Procedure 5 Replacement check

The system board may be disconnected or damaged. Disassemble the computer following the steps described Replacement Procedures. Check the connection between the AC adaptor and the system board. After checking the connection, perform Check 1:

Check 1

Use a millimeter to make sure that the fuses on the system board are not blown.

- If a fuse is not blown, go to Check 2.
- If a fuse is blown, go to Check 3.

Check 2

Make sure that the battery cable is firmly connected to the system board.

- If it is connected firmly, go to Check 3.

Check 3

The system board may be damaged. Replace it with a new one following the instructions in Chapter 4.

Display Troubleshooting

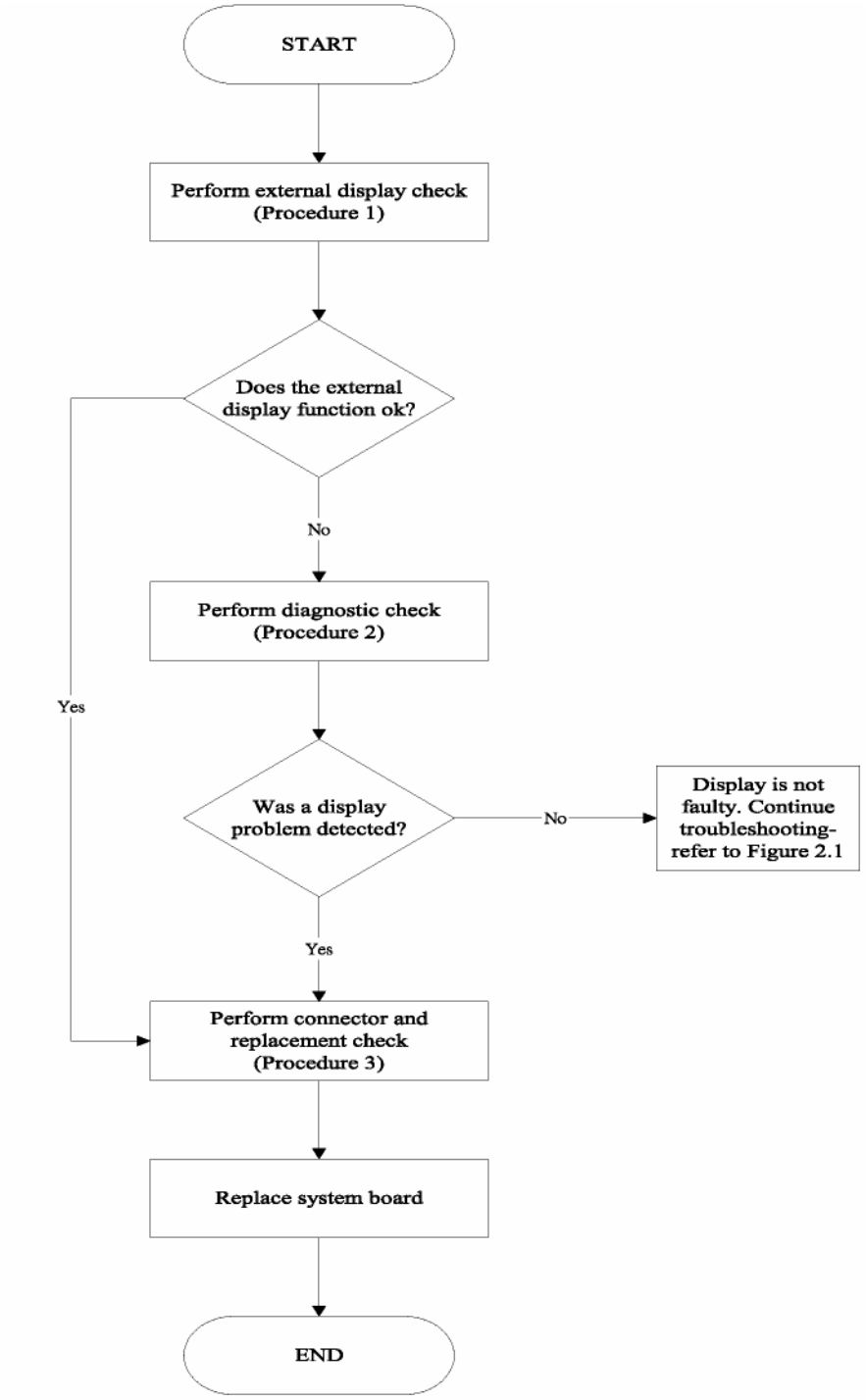


Figure 6-3 Display troubleshooting process

This section describes how to determine if the computer's display is functioning properly. The process is outlined in Figure 6-3. Start with Procedure 1 and continue with the other procedures as instructed.

- Procedure 1: External display check
- Procedure 2: Diagnostic check
- Procedure 3: Connector and replacement check

Procedure 1 External display check

Connect an external display to the computer's external monitor port, then boot the computer. The computer automatically detects the external display. Press Fn+F3 to switch to the external display.

If the external display works correctly, the internal LCD may be damaged. Go to Procedure 3.

If the external monitor appears to have the same problem as the internal monitor, the system board may be damaged. Go to Procedure 2.

Procedure 2 Diagnostic check

The Display Test program is stored on the computer's Diagnostics disk. This program checks the display controller on the system board. Insert the Diagnostics disk in the computer's floppy disk drive, turn on the computer and run the test. Refer to Chapter 3, Tests and Diagnostics for details.

If an error is detected, go to Procedure 3. If an error is not detected, the display is functioning properly.

Procedure 3 Connector and replacement check

The FL inverter board, LCD module, and system board are connected to the display circuits. Any of these components may be damaged. Replacement Procedures, for instructions on how to disassemble the computer and then perform the following checks:

Check 1

Make sure the DDRRAM module is seated properly. Test display again.

- If the problem still exits, replace the DDRRAM module.
- If the problem still exists, perform check 2.

Check 2

Replace the FL inverter board with a new one and test display again.

- If the problem still exists, perform Check 3.

Check 3

Replace the LCD module with a new one and test display again.

- If the problem still exists, perform Check 4.

Check 4

Replace the LCD/FL cable with a new one and test display again.

- If the problem still exists, perform Check 5.

Check 5

Replace the CPU with another of the same specifications.

- If the problem still exists, perform Check 6.

Check 6

The system board may be damaged. Replace it with a new one.

Keyboard Troubleshooting

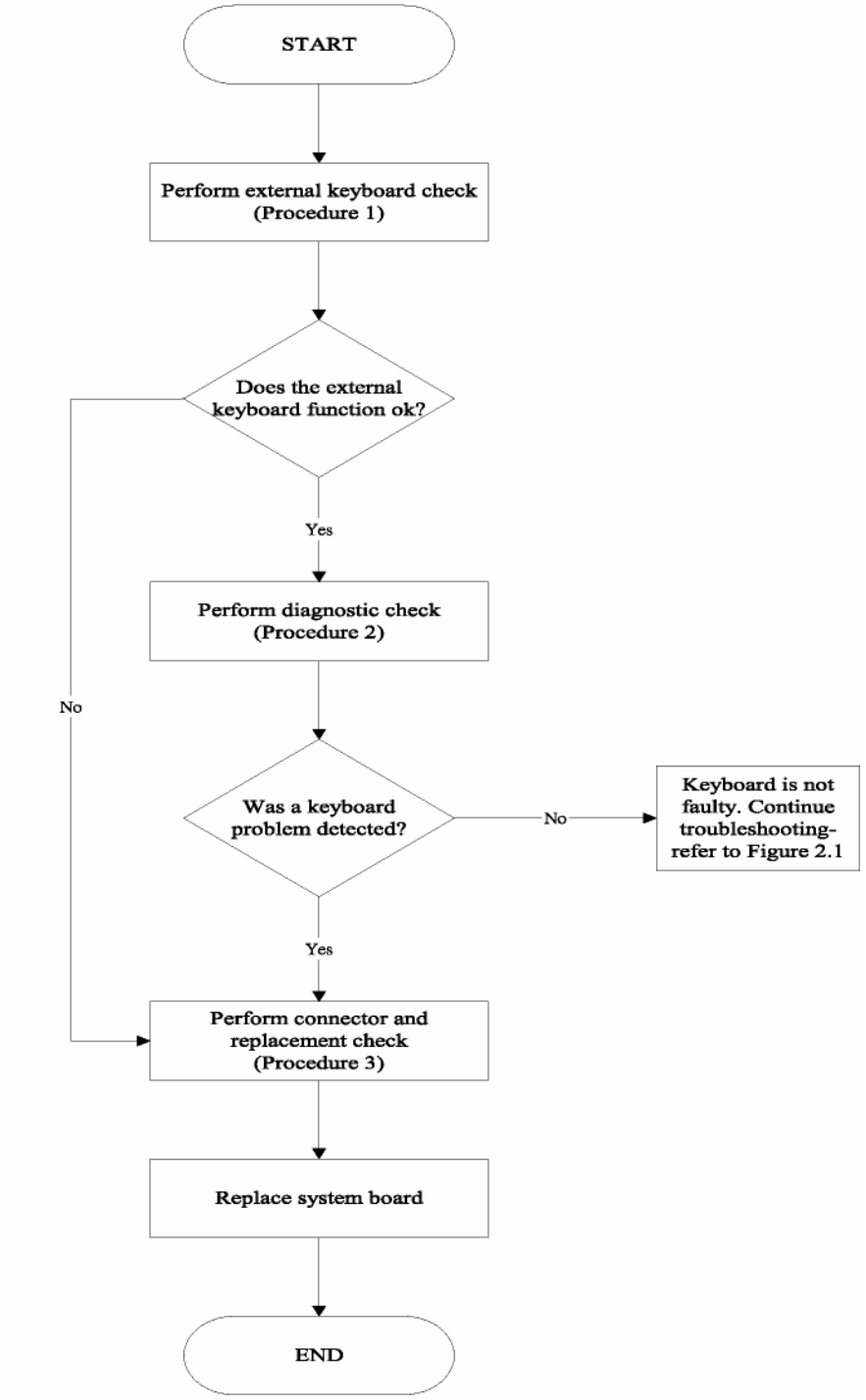


Figure 6-4 Keyboard troubleshooting process

To determine if the computer's keyboard is functioning properly, perform the following procedures. Figure 6-5 outlines the process. Start with Procedure 1 and continue with the other procedures as instructed.

- Procedure 1: External keyboard check
- Procedure 2: Diagnostic check
- Procedure 3: Connector and replacement check

Procedure 1 External keyboard check

Connect a USB keyboard to one of the computer's keyboard/mouse ports, then boot the computer. The computer automatically detects the external keyboard.

If the external keyboard works correctly, the internal keyboard or its connections may be faulty. Go to Procedure 2.

If the external keyboard appears to have the same problem as the internal keyboard, the system board may be damaged.

Procedure 2 Diagnostic test

Run the Diagnostic Program, which will automatically execute the Keyboard Test. Refer to Chapter 3, Tests and Diagnostics for more information on how to run the program.

If an error is located, go to Procedure 3. If an error does not occur, the keyboard is functioning properly.

Procedure 3 Connector and replacement check

The keyboard and/or system board may be disconnected or damaged. *Replacement Procedures* and perform the following checks.

Check 1

Make sure the keyboard cable is firmly connected to the system board.

- If the connection is loose, reconnect firmly and repeat Procedure 2.
- If there is still an error, go to Check 2.

Check 2

The keyboard may be damaged.

- If the problem still exists, perform Check 3.

Check 3

The system board may be damaged. Replace it with a new one.

External USB Devices Troubleshooting

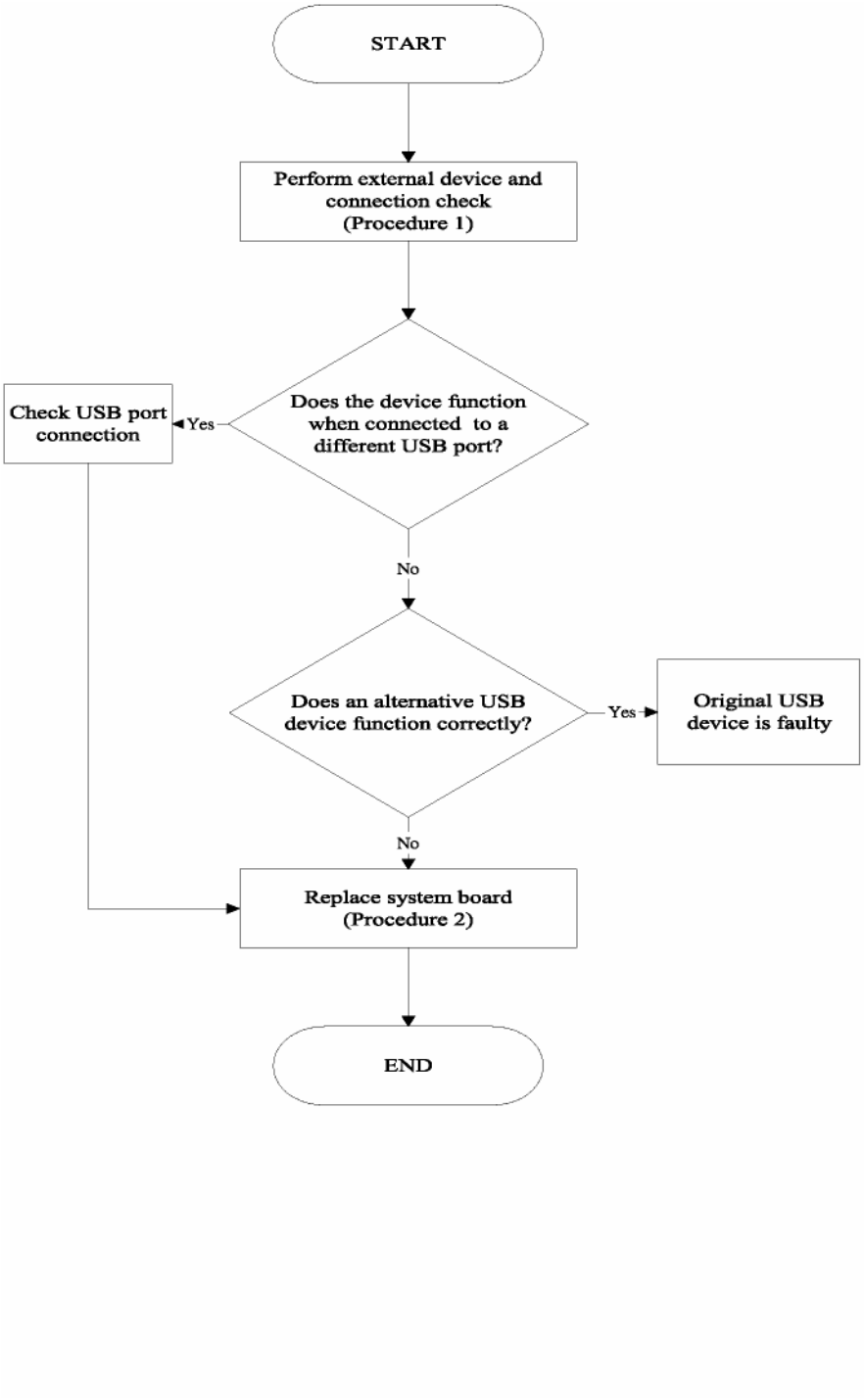


Figure 6-5 External USB device troubleshooting process

To determine if the computer's external USB devices are functioning properly, perform the following procedures. Figure 6-5 outlines the process. Start with Procedure 1 and continue as instructed.

- Procedure 1: External device and connection check
- Procedure 2: Replace system board

Procedure 1 External device and connection check

The USB device may be damaged or the connection may be faulty. Perform Check 1.

Check 1

Make sure USB device cable is firmly plugged into one of the USB sockets.

- If the cable is connected correctly, go to Check 2.

Check 2

Plug the USB device into another USB socket (there are three in all).

- If the USB device still does not work, go to Check 4.
- If the device functions correctly when connected to another USB port, go to Check 3

Check 3

Make sure that the USB socket is firmly secured to the system board of the computer.

- If the malfunction remains, the system board may be damaged. Go to Procedure 2.

Check 4

Connect an alternative USB device to one of the computer's USB ports, and then boot the computer. The computer automatically detects the external device.

- If the alternative USB device works correctly, the original device may be damaged and should be replaced.
- If the alternative USB device appears to have the same problem as the original device, the system board may be damaged. Go to Procedure 2.

Procedure 2 Replace system board

If the error persists, the system board may be damaged.

CRT troubleshooting

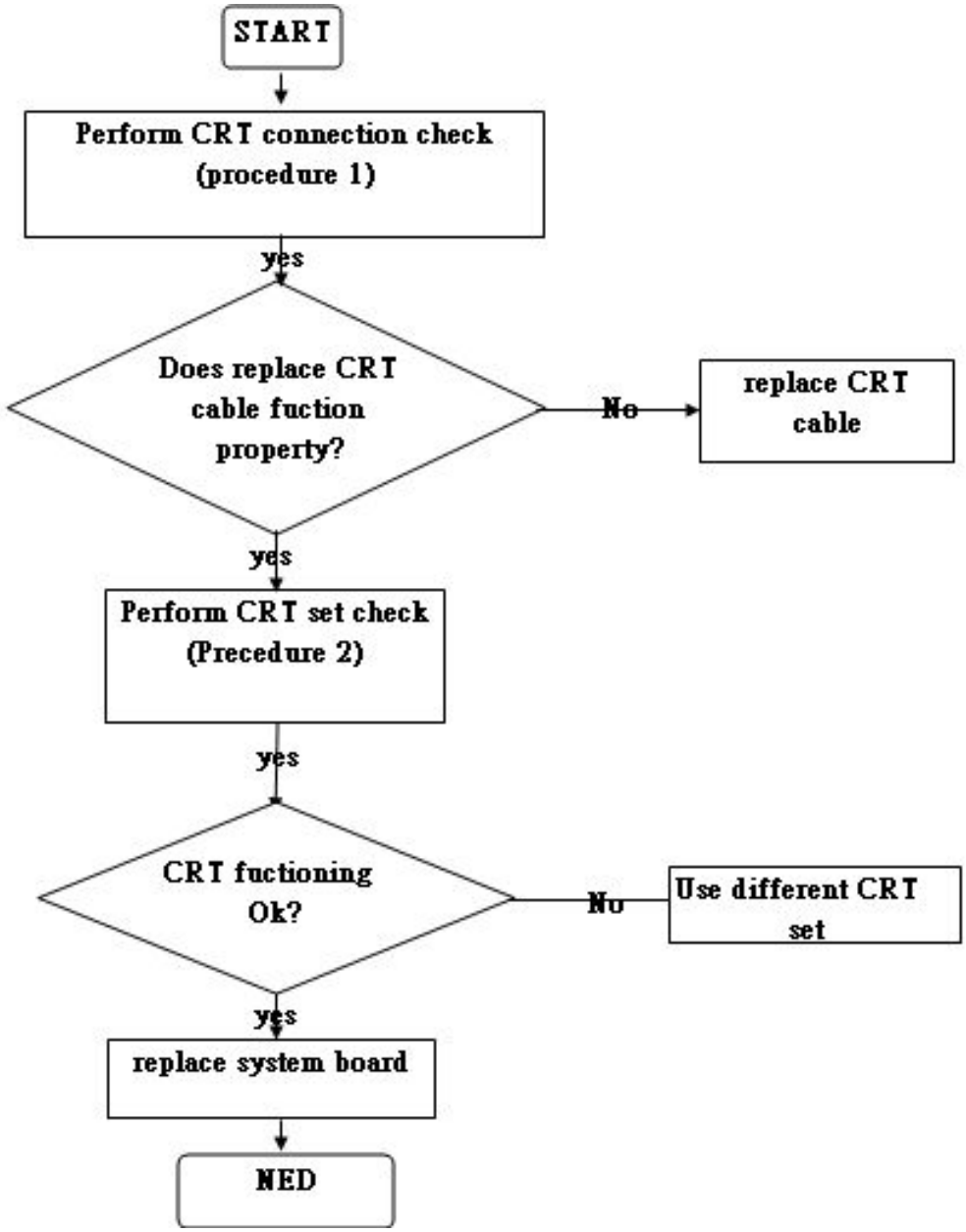


Figure 6-6 CRT troubleshooting process

To determine if the computer's CRT port is functioning properly, perform the following procedures. Figure 6-6 outlines the process. Start with Procedure 1 and continue as instructed.

- Procedure 1: CRT connection check
- Procedure 2: CRT set check

Procedure 1 CRT connection check

The CRT cable may be damaged or the connections may be loose. Perform Check 1:

Check 1

Make sure CRT cable is firmly plugged into both the CRT set and the CRT port of the computer.

- If the cable is connected correctly, go to Check 2.

Check 2

Make sure the CRT port is firmly secured to the system board of the computer.

- If the malfunction remains, go to Check 3.

Check 3

The CRT cable may be damaged. Replace with a good cable.

- If the malfunction remains, go to Procedure 2

Procedure 2 CRT set check

The CRT set may be faulty. Perform Check 1

Check 1

Try using the set for CRT reception.

- If it does not work, the set may be damaged.
- If the set does work, perform Check 2.

Check 2

Try connecting a different CRT to the computer.

- If the replacement television works, the original set may be damaged.
- If the replacement set does not work the system board may be damaged

Touch Pad Troubleshooting

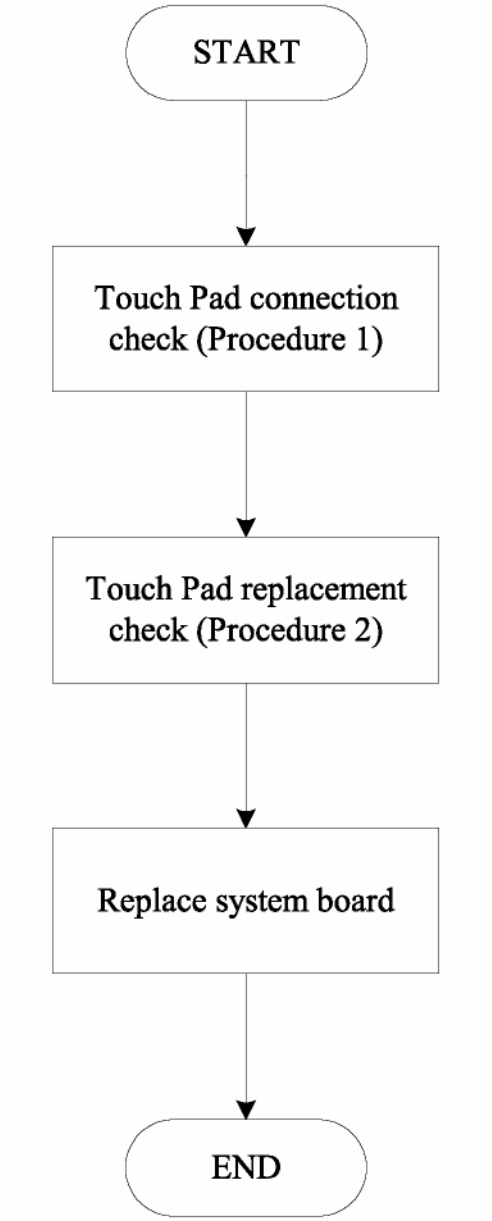


Figure 6-7 Touch Pad troubleshooting process

To determine if the computer's built-in Touch Pad is functioning properly, perform the following procedures. Figure 6-7 outlines the process. Start with Procedure 1 and continue as instructed.

- Procedure 1: Touch Pad connection check
- Procedure 2: Touch Pad replacement check

Procedure 1 Touch Pad connection check

The Touch Pad is connected by the Touch Pad FPC to the system board. Make sure the Touch Pad FPC cable is firmly connected to the Touch Pad and system board. Replacement Procedures for instructions on how to disassemble the computer and then perform the following checks.

If any of the connections are loose, reconnect firmly. If any of the connections is damaged, or there is still an error, go to Procedure 2.

Procedure 2 Touch Pad replacement check

The Touch Pad unit or FPC may be defective or damaged.

Speaker Troubleshooting

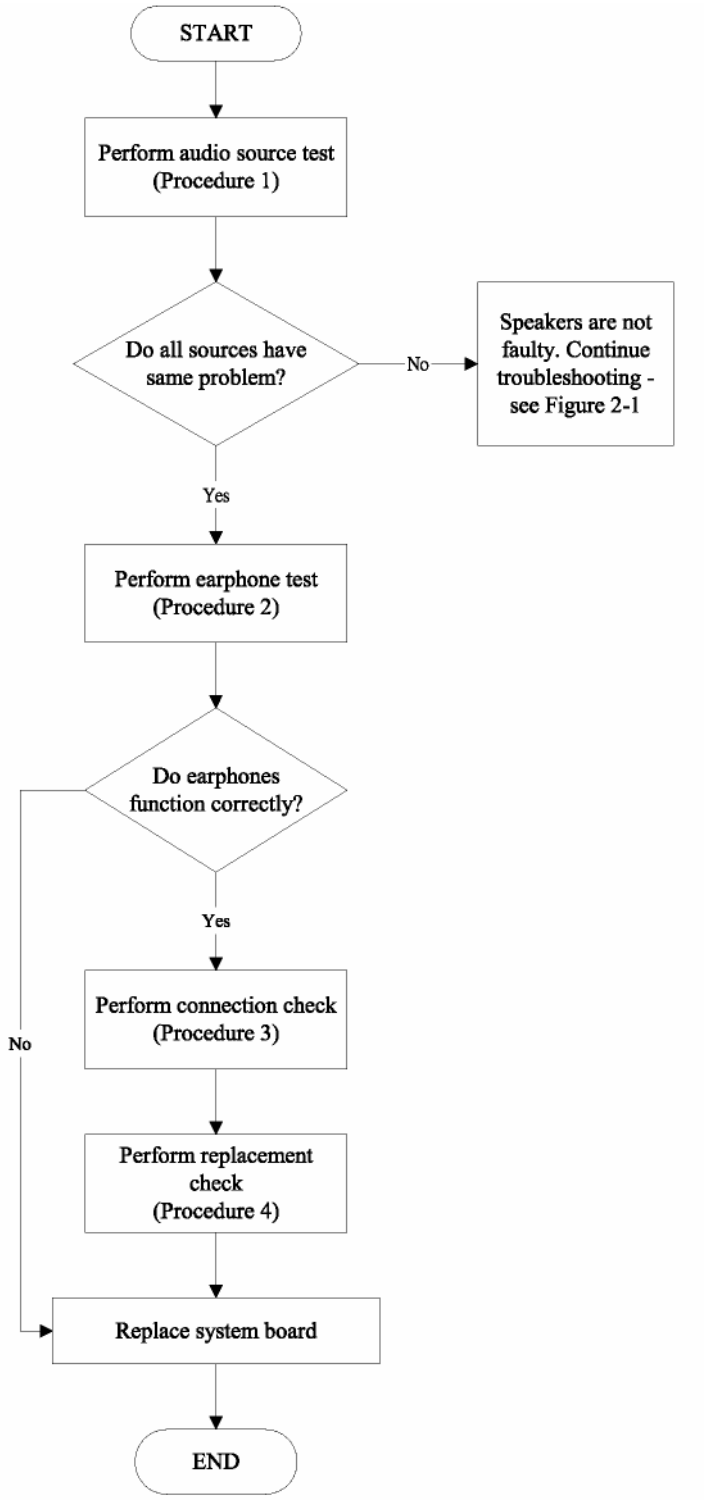


Figure 6-8 Speaker troubleshooting process

To determine if the computer's built-in speakers are functioning properly, perform the following procedures. Figure 6-8 outlines the process. First adjust the speaker volume to an appropriate level. Start with Procedure 1 and continue as instructed.

- Procedure 1: Audio source test
- Procedure 2: Earphone test
- Procedure 3: Connection check
- Procedure 4: Replacement check

Procedure 1 Audio source test

Try different audio sources (e.g. an audio CD and digital music file) to determine whether the fault is in the speaker system or not. If not all sources have sound problems, the problem is in the source devices. If all have the same problem, continue with Procedure 2.

Procedure 2 Earphone test

Connect a set if earphones or external speakers. If these function correctly, go to Procedure 3. If they do not function correctly, the system board may be defective or damaged. Replace it with a new one.

Procedure 3 Connection check

Disassemble the computer following the steps described *Replacement Procedures* and make sure the speaker cable is firmly connected to the system board. If the stereo speakers are still not functioning properly, go to Procedure 4.

Procedure 4 Replacement Check

If the stereo speakers don't sound properly, the stereo speakers may be defective or damaged. Replace them with new ones. If the stereo speakers still do not work properly.

Wireless LAN Troubleshooting

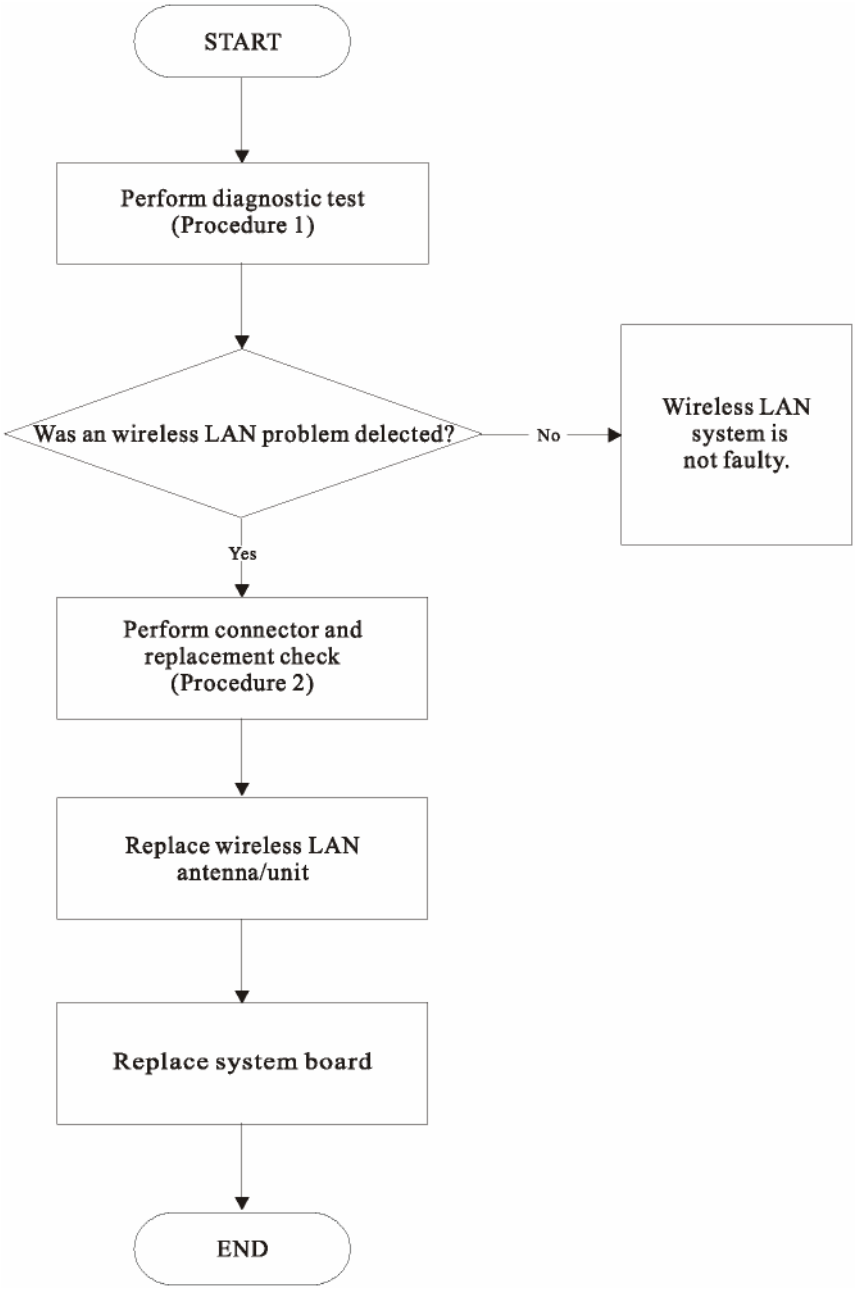


Figure 6-9 Wireless LAN troubleshooting process

The wireless LAN antenna wire, wireless LAN unit or system board may each be the source of a wireless LAN fault. Any of these components may be damaged. To determine if the computer's wireless LAN system is functioning properly, perform the following procedures. Figure 6-9 outlines the process. Start with Procedure 1 and continue with the other procedures as instructed.

- Procedure 1: Diagnostic test
- Procedure 2: Connector and replacement check

Procedure 1 Diagnostic test

Run the Diagnostic Program, which will automatically execute the wireless LAN test. Refer to Chapter 3, Tests and Diagnostics for more information on the program.

If an error is located, go to Procedure 2. If an error is not located, the wireless LAN system is functioning properly.

Check 1: Make sure the wireless select switch installed in your installed programs.

Check 2: press keyboard "Fn+F2" make sure wireless is enable

If the program persist .go to Procedure

Procedure 2 Connector and replacement check

The wireless LAN antenna, wireless LAN unit or system board may be disconnected or damaged. Disassemble the computer following the steps described in Chapter 4, *Replacement Procedures*, and perform the following checks.

Check 1

Make sure that the wireless LAN antenna is firmly connected to the wireless LAN unit (refer to Chapter 4 for instructions) and that the wireless LAN unit is securely slotted into the system board.

- If the problem persists, go to Check 2.

Check 2

Check that the wireless communication switch is turned to "On", then make sure that the wireless communication LED on the front panel is lit.

If the LED is lit but the wireless LAN function is still faulty, the antenna may be damaged. Replace with a new antenna following the steps in Chapter 4, Replacement Procedures.

- If the problem persists, or if the wireless LAN LED is not lit when the wireless communication switch is turned to "On", go to Check 3.

Check 3

The wireless LAN unit may be damaged. Replace it with a new one following the instructions in Chapter 4.

- If the problem still exists, perform Check 4.

Check 4

The system board may be damaged. Replace it with a new one following the instructions in Chapter

Reference: Hook Release Procedure

E:\030\NTV00\
service manual\ntv00-